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SESSION A: PEDAGOGY AND LEARNING

Discussant Remarks: Dr. Don Johnson

[An Exploratory Examination of the Kolb Experiential Educator Role Profile](#) 1-13

Marshall A. Baker, Jason P. Twenter

[Student Teaching Changed Me: A Look at Kolb's Learning Style
Inventory Scores Before and After the Student Teaching Experience](#) 14-26

Kasee L. Smith, John Rayfield

[A Comparison of Experiential Learning Techniques
& Direct Instruction on Student Knowledge of Agriculture](#) 27-39

Timothy Bradford Jr., Dr. Gaea Hock, Dr. William Kingery

[Undergraduate Student Thought on Using the Science of
Genetic Modification as a Solution to Citrus Greening](#) 40-52

Dr. Joy N. Rumble, Taylor K. Ruth, Courtney T. Owens, Dr. Alexa J. Lamm, Melissa R. Taylor, Dr. Jason D. Ellis.

SESSION B: AGRICULTURAL COMMUNICATIONS AND ISSUES

Discussant Remarks: Dr. Donna Graham

[Communicating about Contentious Issues: Florida Extension Agents' Role](#) 53-64

Leal, A., Rumble, J. N., Lamm, A. J., & Gay, K. D.

[Undergraduate Students' Knowledge of International Agricultural Issues
by Academic Standing](#) 65-76

Sarahi Morales, Todd Brashears

[Teaching with Animals: The Role of Animal Ambassadors in
Improving Presenter Communication Skills](#) 77-87

Dr. Nicholas E. Furman, Dr. Eric D. Rubenstein

[Identifying the Needs of Opinion Leaders to Encourage
Widespread Adoption of Water Conservation and Protection](#) 88-98

Melissa R. Taylor, Dr. Alexa Lamm

SESSION C: UNDERGRADUATE STUDENT EXPERIENCES

Discussant Remarks: Dr. Kirk Swortzel

[Experiences of Hispanic Students Enrolled in a College of Agriculture](#) 99-109

Isbel Whitehead, Christopher M. Estep

[Personality and Goal Orientation of Undergraduate](#)

[Agricultural Leadership Students: An Empirical Analysis](#) 110-122

Dr. Kevan W. Lamm, Emanah Sheikh, Dr. Hannah S. Carter, Dr. Alexa J. Lamm

[Relationship Between Academic Engagement, Achievement,](#)

[and Student Satisfaction Among Senior in a Land Grant College of Agriculture](#) 123-133

Donald M. Johnson, Catherine W. Shoulders, Leslie D. Edgar, Donna L. Graham, & K. Jill Rucker

[Perceptions of Agricultural Careers for African American Students](#)

[Through the Lens of the Holistic Development Theory](#) 134-146

Marshall A. Baker, Cassie M. Graham, Richie Roberts, Diane Montgomery

SESSION D: AGRICULTURAL LEADERSHIP

Discussant Remarks: Dr. Ed Osborne

[Perceptions of Agricultural Leadership Academic Programs](#)

[at 1862 Land-Grant Institutions](#) 147-156

Jackson Alexander, Dr. K. Jill Rucker, Dr. Donna L. Graham

[A Theory Based Model of Interpersonal Leadership for Use in](#)

[Agricultural Leadership Education](#) 157-176

Dr. Kevan W. Lamm, Dr. Hannah S. Carter, Dr. Alexa J. Lamm

[Acculturation and Leadership Styles Among Latino or](#)

[Hispanic Faculty and Staff at Texas Tech University](#) 177-189

Baleshka Brenes, Amy Boren, Todd Breshears

[Using Mentor Insights to Enhance Leadership Development Programs](#)

190-202

Dr. Kevan W. Lamm, Dr. Alexa J. Lamm, Dr. L. Rochelle Sapp

SESSION E: SCHOOL-BASED AGRICULTURAL EDUCATION PROGRAMS

Discussant Remarks: Dr. Jim Flowers

[Exploring the Motivations of Competitors in the FFA Meats Evaluation Career Development Event](#) 203-213

Kevin Curry Jr., Dr. Wendy Warner, Dr. Travis Park

[Analyzing Texas FFA as a Brand Using Instagram](#) 214-224

Brooke Prather, Lindsey Froebel, Dr. Tracy Rutherford

[National FFA's Brand Through the Eyes of Its Members: A Content Analysis](#) 225-236

Jackie Hill, Victor Salazar, Dr. Tracy Rutherford

[Descriptio of Millennial and Non-Millennial Agriculture Teachers' Current and Ideal Emphasis on the Three Components of the Agricultural Education Program](#) 237-250

Dr. Catherin W. Shoulders, Hannah Toland

SESSION F: TEACHING AND LEARNING IN HIGHER EDUCATION

Discussant Remarks: Dr. Kirby Barrick

[Variability versus Continuity: Student Teachers' Perceptions of Two University Supervision Formats](#) 251-261

Dr. Catherine W. Shoulders, Dr. Don E. Edgar, Andrew Bolton

[Lessons Learned: Describing the Preservice Preparation Experiences of Early-Career Award-Winning Agricultural Educators](#) 262-272

Lockie R. Breeding, John Rayfield, Kasee L. Smith

[Early-Career Migration of Agriculture and Human Environmental Sciences B.S. Graduates: Evidence from One Land Grant University](#) 273-282

Donald M. Johnson, Catherine W. Shoulders, Leslie D. Edgar

[A Comparison of the Perceptions of Agricultural Education Professors with Undergraduate and Graduate Students Regarding the Importance of Student-to-Student Interaction in Distance Education Classes](#) 283-295

Gary Moore, Wendy Warner, Jane Bachelor, David Jones

SESSION G: SCHOOL-BASED AGRICULTURAL EDUCATION TEACHERS

Discussant Remarks: Dr. Brian Myers

Assessing the Relationship of Teacher Self-Efficacy, Job Satisfaction,
and Perception of Work-Life Balance of Louisiana Agriculture Teachers 296-308

J. Joey Blackburn, J.C. Bunch, J. Chris Haynes

Teachers' Beliefs about the Purpose of Agricultural Education
and its Influence on their Pedagogical Content Knowledge 309-322

Amber H. Rice, Tracy Kitchel

Using Epistemological Positions and Orientations to Instruction to Explore
School-Based, Agricultural Educators Perceptual Identities: A Q-Sort Study 323-336

Richie Roberts, Dr. Diane Montgomery

The Black Swans of Agricultural Education:
An Empirical Account of the Unique Lived Experiences
that Structure Urban Agricultural Educators Meaning in Work 337-349

Richie Roberts, Dr. Jon W. Ramsey

SESSION H: SCHOOL-BASED AGRICULTURAL EDUCATION STUDENTS

Discussant Remarks: Dr. Shane Robinson

Connecting Problem-Solving Style to Peer Evaluations of
Fellow Team Members' Performance in Secondary Cooperative Learning Projects 350-359

Sarah Bush, Dr. Curtis Friedel, Lindsay Hoerbert, Thomas Broyles

Effects of the Order of Abstraction and Type of Reflection
on Content Knowledge When Teaching Experientially in a High School Classroom 360-372

Catherine A. DiBenedetto, Jessica M. Blythe, Brian E. Myers

The Effect of Pedagogy on Students' Long-Term Retention of Knowledge 373-386

Marshall A. Baker, J. Shane Robinson

What's the Problem?
Investigating Factors that Influence the Hypothesis Generation
Ability of School-Based Agricultural Education Students when Troubleshooting 387-399

J. Joey Blackburn, J. Shane Robinson

SESSION I: EXTENSION EDUCATION AND PROGRAMMING

Discussant Remarks: Dr. Matt Baker

[Exploring the Differences in Water Conservation Behaviors](#)

[Among High Water Users in Three Regions of Florida: Hints for Extension Educators](#) 400-412

Pei-wen Huang, Dr. Alexa J. Lamm, Dr. Michael D. Dukes

[Cognitive Dissonance: A Theoretical Perspective](#)

[to Explain Intentions to Conserve Water](#)

413-426

Anil Kumar Chaudhary, Dr. Alexa J. Lamm

[Discerning Gaps Between Public and Decision Maker](#)

[Views of Agricultural Water Use to Inform Practice](#)

427-437

Dr. Alexa J. Lamm, Melissa R. Taylor, Kevan W. Lamm

[Using Critical Thinking Styles to Inform Landscape](#)

[Water Conservation Extension Programs](#)

438-448

Mr. Courtney T. Owens, Dr. Alexa J. Lamm

An Exploratory Examination of the Kolb Experiential Educator Role Profile

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Abstract

This descriptive census study utilized the Kolb Educator Role Profile to describe pre-service agricultural educators preferred roles in facilitating learning experiences. A census of 124 pre-service agricultural educators at Oklahoma State University yielded 116 respondents. Kolb's Educator Role Profile was utilized to quantify four major roles critical to successful experiential learning: facilitator, expert, evaluator, and coach. A strong preference for the coaching role was identified, along with a noted weakness in the expert role. Pre-service agricultural educators preferred the action and learner focused environments and demonstrated very little balance in their overall role preferences. Psychometrically, the ERP performed poorly in measuring all four roles and it was concluded that significant attention to improving reliability was necessary. It was recommended that teacher education programs improve the measure, utilize it to bring awareness to the importance of the four roles, and continue to research interventions that lead to enhanced balance.

Introduction

Experiential learning is a term that is plagued by ambiguity (Baker, Robinson, & Kolb, 2012; Knoblock, 2003; Moore, 2009; Roberts, 2006; Roberts 2012; Savage, 2010). The answer to the question “Is experiential learning a philosophy, a method, a field, or all three?” is a somewhat complicated response of “Yes.” Roberts (2012, p. 9) asked, “How do we hang on to the distinctive ways experiential education frames the educational process while at the same time ensur[e] that it does not become quaint and overly isolated?” It is important to make the distinction between the philosophy of experiential education and the teaching and learning method of experiential learning (Itin, 1999). The ambiguity surrounding experiential learning hampers discussions of theory and praxis (Roberts, 2012).

Experiential learning has been utilized as a method in a number of domains like engineering (Abdulwahed & Nagy, 2009), nursing (Birch et al., 2007), wildlife (Millenbah & Millsbaugh, 2003), agricultural education (Baker et al., 2012; Knobloch, 2003; Roberts, 2006), and a number of other contexts. “Unless experience is so conceived that the result is a plan for deciding upon subject-matter, upon methods of instruction and discipline, and upon material equipment and social organization of the school, it is wholly in the air” (Dewey, 1938, p. 28). Though an experiential approach to learning is not bound to a specific method, educators must recognize “in the concrete what surroundings are conducive to having experiences that lead to growth” (p. 40).

So what is an experiential learning method? First, all learning involves a prior and/or current experience (Kolb, 2015). This method has received attention as a reaction against the highly structured, overly didactic, teacher controlled transmission of knowledge approach that occurs in numerous public schools daily (Begeny & Martens, 2006). It supports a more participative, learner-centric approach with an emphasis on direct engagement, learning experiences, and the construction of knowledge by the learner (Andreson, Boud, & Cohen, 2000). Six characteristics define learning and are purposefully planned for in the experiential approach to learning (Kolb, 2015). These characteristics of experiential learning are: (a) learning is best conceived as a process, not in terms of outcomes; (b) learning is a continual process grounded in experience; (c) the process of learning requires the resolution of conflicts between dialectically opposed modes of adaption to the world; (d)

learning is a holistic process of adaptation to the world; (e) learning involves transactions between the person and the environment; (f) learning is the process of creating knowledge (Kolb, 2015).

Andreson et al. (2000) synthesized a number of key experiential learning theories and put forth six defining characteristics that distinguish experiential learning from other methods:

1. Experiential learning demands that three factors are present – intellect, feelings, and senses. Learning takes place in this holistic context.
2. Personal experience is the root of the learning process. Those experiences must be recognized and acted on so that learning is integrated into the learner's values and understanding.
3. Purposeful, guided reflection must be present so students can add to, and transform, ideas and concepts into deeper understanding. Learning is the process whereby knowledge is created through the transformation of experience (Kolb, 1984).
4. The design of experiences must be intentional. Deliberately designed learning events are often referred to as structured activities and include simulations, games, role-play, visualizations, focus group discussions, and hypothetical scenarios.
5. Learning must be facilitated. Teachers, coaches, parents, leaders and/or others must be present and play important roles as a facilitator, expert, evaluator, and coach (Kolb, 2015).
6. Learning outcomes are identified and assessed. Experiential learning is more concerned with the process than the product, and assessments should be congruent with that theme. Assessments include group projects, critical essays, reading logs, learning journals, negotiated learning contracts, peer assessment, and authentic assessments.

These six characteristics represent the means by which learning occurs experientially. The end involves learners' own appropriation of what is personally significant and meaningful (Andreson et al., 2000).

Steinaker and Bell (1979) worked to make the connection between theory and teaching in a number of settings, including formal settings.

When [experiential learning] is keyed in a curriculum to a series of taxonomically sequenced teaching strategies and learning experiences, it can augment learner achievement. Using the experiential taxonomy, one can plan an experience with specific objectives, with a series of taxonomically ordered activities keyed to identified teaching strategies, and with correlated elements of creativity, critical thinking, and problem solving. (Steinaker & Bell, 1979, p. xi)

The taxonomy of experiential learning, discussed by Steinaker and Bell (1979), includes five taxonomic levels: (a) exposure, (b) participation, (c) identification, (d) internalization, and (e) dissemination. Exposure is defined as the consciousness of the experience. This includes the role of the teacher in gaining attention, maintaining student confidence, and keeping the anxiety level of the associated stimuli within bounds. Participation is when the learner decides to become involved in the experience actively. The teacher must provide specific and purposeful guidance throughout this level providing the necessary structure and focus on learning goals. Identification is the point when the experience is moving toward the grasping of abstract concepts of interest to the lesson. Teachers must act as a moderator and/or prompt to facilitate the learning process. Internalization occurs when students begin to accommodate new knowledge into previous schemas so that change occurs within the individual. Teachers begin to remove their scaffolding as students begin to extend the knowledge on their own. Finally, dissemination represents the point where students retain the information desired and extend that information in ways they choose. Teachers must provide a variety of venues by which students can express the experience (Steinaker & Bell, 1979).

Davis (1993) furthered the discussion of the roles teachers play in guiding the student through the experiential learning process when he developed the conceptualized the transactive process of learning between the student and teacher. Germain and Gitterman (1980) mirrored this transactive process and made transparent the role of the teacher in facilitating experiential learning in the *Diamond Model of the Philosophy of Experiential*

Education. The model highlighted this dynamic learning process bring light to the learning environment, subject matter, the student, and the teacher (Germain & Gitterman, 1980), and noted the importance of the teacher establishing goals, tailoring material, and delivering the content effectively.

Though the theoretical discussion of the *method* of experiential learning was helpful, there remained a gap in specific extensions to praxis. Kolb et al. (2014) created the Kolb Educator Role Profile (KERP) to “assist educators in their application of ELT concepts” (p. 220). This framework further clarified the roles an experiential educator must play and developed an instrument to quantify teachers preference for each role – the *Kolb Educator Role Profile* (KERP) (Kolb et al., 2014). It is this conceptualization of teaching experientially that serves as the theoretical and conceptual framework.

Theoretical/Conceptual Framework

Kolb (2015) defines learning as, “the process whereby knowledge is created through the transformation of experience” (p. 49). The Experiential Learning Theory (ELT) (Kolb, 2015) portrays two dialectically opposed modes of learning – grasping and transforming. Knowledge is grasped either through a concrete experience (CE) or through abstract conceptualization (AC). Knowledge is transformed through reflective observation (RO) or active experimentation (AE). Learning then occurs when an individual resolves conflicts between these modes. The learning process is cyclical as all learning is re-learning (Kolb, 2015). As an individual develops and progresses through the cycle, the four modes become more integrated and complex.

The *Educator Role Profile* (ERP) is a framework, based on ELT, focusing on the role of the educator as they teach around the experiential learning cycle (Kolb, Kolb, Passarelli, & Sharma, 2014). The framework was created to assist educators in organizing educational activities and methods in order to purposefully support students in addressing all four modes of learning – CE, RO, AC, and AE (Kolb et al., 2014). To catalyze the learning process, teachers must adapt their role as students move through the cycle serving as a Facilitator, Subject Matter Expert, Standard-Setter/Evaluator, and to Coach as shown in Figure 1. Kolb et al. (2014) defined each role:

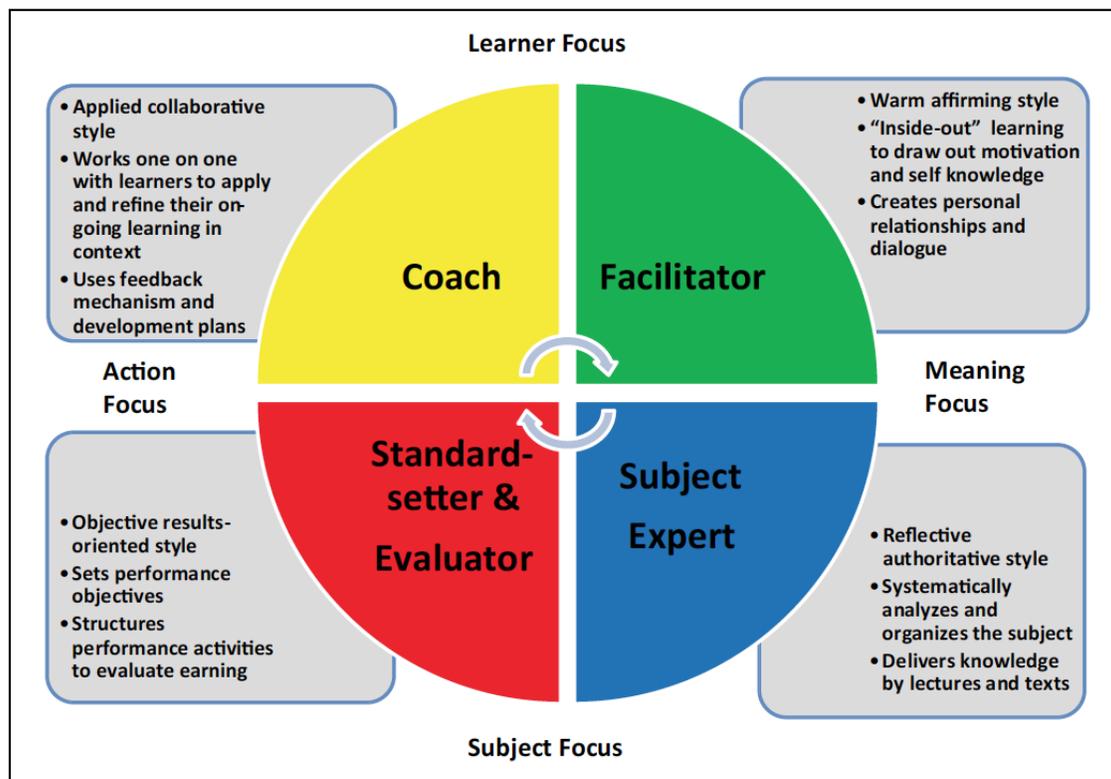
The Facilitator Role. When facilitating, educators help learners get in touch with their personal experience and reflect on it. They adopt a warm affirming style to draw out learners’ interests, intrinsic motivation, and self-knowledge. They often do this by facilitating conversation in small groups. They create personal relationships with learners.

The Subject Expert Role. In their role as subject expert, educators help learners organize and connect their reflections to the knowledge base of the subject matter. They adopt an authoritative, reflective style. They often teach by example, modeling and encouraging critical thinking as they systematically organize and analyze the subject matter knowledge. This knowledge is often communicated through lectures and texts.

The Standard-Setter/Evaluator Role. As a standard-setter and evaluator, educators help learners master the application of knowledge and skill in order to meet performance requirements. They adopt an objective results oriented style as they set the knowledge requirements needed for quality performance. They create performance activities for learners to evaluate their learning.

The Coaching Role. In the coaching role, educators help learners apply knowledge to achieve their goals. They adopt a collaborative, encouraging style, often working one-on-one with individuals to help them learn from experiences in their life context. They assist in the creation of personal development plans and provide ways of getting feedback on performance. (Kolb et al., 2014, pp. 220 – 221)

Figure 1.
Role
Adapted



Educator
Profile.
from "On

Becoming an Experiential Educator: The Educator Role Profile” by A. Kolb, D. Kolb, A Passarelli, and G. Sharma, 2014, *Simulation and Gaming*, 45(2), p. 220. Copyright 2014 by SAGE Publications.

As depicted in Educator Role Profile (see Figure 1), the teaching roles compliment the Experiential Learning Model (Kolb, 2015) and serve as “bridging strategies between the learning modes” (Kolb et al., 2014, p. 222). In the grasping dialect, there is either a learner or a subject focus. In the transformation dialect, there is either an action or meaning focus. Each educator adopts these roles to some extent in their facilitation of learning and all are required for maximal learning (Kolb et al., 2014). Each individual educator – based on their philosophical stances on learning, learning style, training, and requirements of their context – has a preference for one or two roles over the others. The ERP Self-Assessment (Kolb et al., 2014) was designed to help elucidate those preferences and help educators “sharpen their awareness of these preferences and to make deliberate choices about what works best in a specific situation” (p. 221). Though a number of other instruments have been utilized to measure teacher modes related to ELT (Rudowski, 1996; Svinicki & Dixon, 1987; Wheeler & Marshall, 1986), they each focus on individual teaching *styles* whereby the teacher is acting *on* learners. The ERP, in contrast, focuses on important roles that all educators should include as they interact *with* learners (Kolb et al., 2014) and provides valuable clarity in the pedagogical approaches supporting experiential learning.

Need and Purpose of the Study

Agricultural education has shared in the struggle to define the methods of experiential learning. Kirschner, Sweller, and Clark stated that, “the result of [experiential learning] is a series of recommendations that most educators find almost impossible to implement” (Kirschner et al., 2006, p. 76). Roberts (2006), Knobloch (2003), and Baker et al. (2015) have each called for further theoretical and practical clarification of experiential learning. “Agricultural educators need a common language of current learning theory to communicate the pedagogical concepts of experiential learning” (p. 26). Roberts (2006) proposed the *Model of Experiential Learning Contexts* to define better various experiential learning activities, but there remains no clarification

regarding the specific roles an educator plays in facilitating experiences that lead to learning. Kolb (2015) provided that clarification in proposing four educator roles that assist experiential educators as they “teach around the learning cycle” (p. 302).

The teacher education program at Oklahoma State University adopted the ERP framework to inform students and conceptualize how one teaches experientially. As explained by Kolb et al. (2014), educators have preferences and it is critical that educators are aware of them in order to develop balance and facilitate high quality learning experiences. As such, it was critical to answer the question, “What are the educator role preferences of our current pre-service agricultural educators?” The answer would provide valuable insight into the chosen teacher training experiences, the balance or lack thereof of teaching roles, the homogeneity of pre-service teachers attracted to our program, and the areas of greatest strength and need. In addition, research and confirmation of the ERP for use in agricultural education could begin to bring clarity to the ambiguous question, “How does one teach experientially?” and provide metrics to measure the four educational roles.

The purpose of this study was to identify the preferred teaching roles of pre-service agricultural educators at Oklahoma State University, identify trends and systematic differences that may exist, and to examine the performance of the ERP in an agricultural education population to better inform the teacher education program in developing experiential educators.

Research Objectives

Five research objectives guided the study:

1. Describe the population of secondary agricultural education pre-service teachers.
2. Identify the preferred teaching roles of secondary agricultural education pre-service teachers.
3. Identify secondary agricultural education pre-service teachers preferences for action versus meaning, as well as for subject matter versus learner centered.
4. Identify secondary agricultural education pre-service teachers teaching role balance.
5. Examine the performance of the Kolb Educator Role Profile in a population of pre-service agricultural educators.

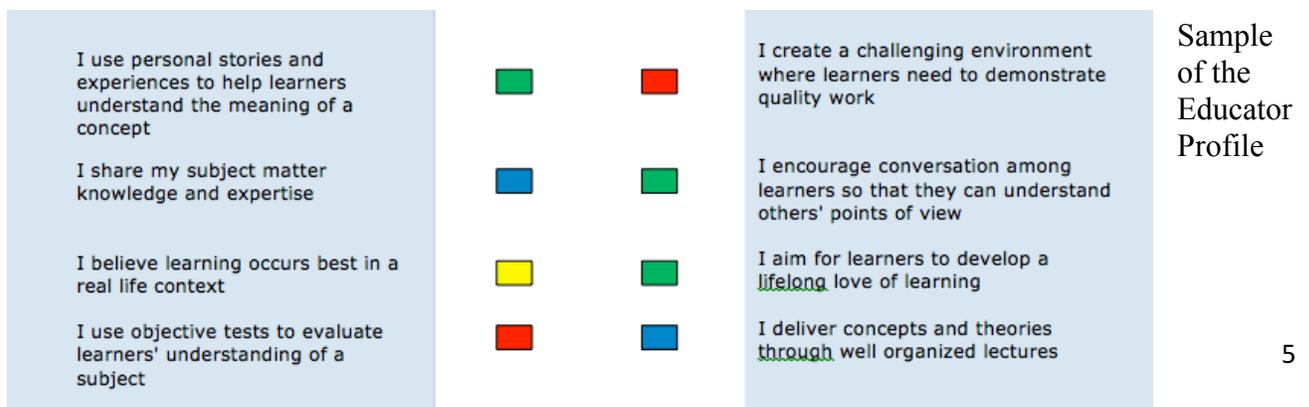
Methods and Procedures

This descriptive census study utilized a population frame of all pre-service agricultural educators enrolled in upper level agricultural education courses at Oklahoma State University from August 2014 to August 2015 ($N = 124$). Due to the population size, a census approach was employed, as suggested by Johnson and Christensen (2014), which included 116 respondents (94% of the population).

Instrumentation

The ERP (Kolb et al., 2014) was developed to assist in the measurement of the four educator roles that support facilitation of learning experiences – Facilitator, Subject-Matter Expert, demonstrating the question stems and

Figure 2. section Kolb Role and



dichotomous scoring format.

Standard-Setter/Evaluator, and Coach. Item generation began with the development of 96 items utilizing a 7-point Likert-type scale. Twenty-four items were included for each of the four roles. The resulting alpha coefficients were coach (.84), facilitator (.83), subject expert (.82), and standard-setter/evaluator (.91) – all of which were strong and acceptable (Johnson & Christensen, 2014). Kolb et al. (2014) then utilized the reliability analysis to select 16 anchor items anchored to each of the four roles for a total of 64 items. A dichotomous forced-choice format (see Figure 2) paired each educator role against the other roles three times. This final format included 32 forced-choice pairings. The dichotomous forced-choice version of the instrument saw expected reductions in alpha coefficients due to the reduction of scale variation. Split-half reliabilities were strong for the Coach (.74) and Facilitator (.82) roles, but were weak for the Expert (.59) and Evaluator (.56) roles (Kolb et al., 2014).

The instrument is scored by totaling the number of role choices in each category, resulting in a score between 0 and 16 for each educator role. To emphasize preferences for the two dialectical modes of learning embedded in ELT, combination scores are also calculated. One combination score focuses on the preference for subject matter versus learner-centered instruction ($[Expert + Evaluator] - [Coach + Facilitator]$) while another combination focuses on the preference for action versus meaning ($[Evaluator + Coach] - [Facilitator + Expert]$). A teacher role balance score is calculated by computing the variance of the four role scores with a low variance indicating a more balanced educator role profile (Kolb et al., 2014).

Data Collection and Analysis

The ERP was administered through an online format that is found at: <http://survey.learningfromexperience.com/>. Each pre-service agricultural educator in the population frame ($N = 124$) was asked to utilize the link and access the instrument as a class assignment. Once the survey was completed, an individual report was sent via email to each student providing their ERP scores and auxiliary information related to teaching experientially. These reports are used extensively in the teacher education courses to frame the pedagogy of teaching experientially. Item analysis was collected by the research team and utilized for educator role score compilation and reliability analysis.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 21. Frequencies were utilized to answer research objective one. Total educator role scores were calculated, along with the accompanying combination scores, to address research objectives two and three. The balance score, referred to in objective four of the study, was calculated using the following variance formula:

$$s^2 = \frac{\Sigma [(Facilitator - \bar{X})^2 + (Evaluator - \bar{X})^2 + (Coach - \bar{X})^2 + (Expert - \bar{X})^2]}{3}$$

Using the syntax function, the variance equation was entered and executed. Research objective five included a post hoc alpha coefficient reliability analysis. Spearman-Brown corrected split-half reliability estimates (Shultz & Whitney, 2005) were utilized to measure reliability in order to compare coefficients with those reported by Kolb et al. (2014). Those reliability coefficients are reported as findings of objective five due to the nature of this exploratory study.

Findings

The first objective of this study sought to describe the population of secondary agricultural education pre-service teachers. Due to restrictions in place by the Internal Review Board governing the ERP, the only

demographic information collected was sex and age of the respondents. Of the 116 participating educators, 63 (54.3%) were female and 52 (44.8) were male. The average age of the respondents was 21.52 years

Research objective two focused on describing the preferred teaching roles of pre-service agricultural educators at Oklahoma State University (see Table 1). The mean ERP score for each of the four roles – Coach, Facilitator, Expert, and Evaluator – is reported in Table 1, followed by the standard deviations in parentheses. The coaching role reported the highest mean of 12.26 (2.09) while the expert role was lowest at 4.99 (2.30). Eighty eight percent of the respondents scored coach as their most preferred role while only 1.7% were identified as experts or facilitators first (see Table 2). Figure 3 visually depicts the average educator role profile for Oklahoma State University’s pre-service agricultural educators with the following percentages: coach 39%, facilitator 22%, evaluator 23%, and expert 16%.

The third research objective was to describe the combination scores that indicate a preference for subject versus learner focus and a preference for action versus meaning. Mean scores, followed by standard deviations, are reported in the Subject/Learner and Action/Meaning columns. The mean subject/learner score was a -7.17 (6.02) indicating a preference for learner focus while the action/meaning combination score was 7.36 (5.25) indicating a preference for action. Research question four focused on describing the total role balance, which was 41.09 (21.93) and is presented in the Balance column of Table 1.

Table 1

ERP Scores for Pre-service Teachers at Oklahoma State University

Sample	n	Coach	Facilitator	Expert	Evaluator	Subject	Action/	Balance
						/	Meaning	
						Learner	g	
Total	116	12.26 (2.09)	7.17 (2.24)	4.99 (2.30)	7.27 (2.27)	-7.17 (6.02)	7.36 (5.25)	41.09 (21.93)

Note. The values in parentheses refer to standard deviation. ERP = Educator Role Profile

Table 2

ERP Ranking Frequencies and Percentages

Rank	Coach		Evaluator		Expert		Facilitator	
	f	%	f	%	f	%	f	%
1	103	88.8	9	7.8	2	1.7	2	1.7
2	10	8.6	48	41.4	13	11.2	45	38.8
3	3	2.6	42	36.2	33	28.4	38	32.8
4	0	0.0	17	14.7	68	58.6	31	26.7



Figure 1. Pie chart showing the relative percent of each score for the average pre-service teacher at Oklahoma State University.

Research objective six sought to evaluate the performance of the *KERP* in this population. Split-half reliabilities were calculated for each of the four educator roles. All eight measures were below the .70 desired coefficient for the study population frame and are reported in Table 3.

Table 3

Comparison of the Reliability Coefficients of Kolb's Two Validation Studies and Those Achieved in This Study

	Original Validation Study Using Likert Scale ^a	Kolb et al. Reliability ^b	This Population Reliability ^b
Coach	.84	.74	.48
Facilitator	.83	.82	.57
Expert	.82	.59	.46
Evaluator	.91	.56	.32
Learner Focus	-	.88	.56
Subject Focus	-	.70	.56
Action Focus	-	.70	.46
Meaning Focus	-	.81	.46

^a Cronbach Alphas ^b Split-Half Reliabilities Using the Spearman-Brown Coefficient

Conclusions, Discussions, and Implications

Prior to extending the findings of this study, it is important to note a number of limitations. First, it is recognized that this examination is intended to only describe the 116 participants of this study. No attempt is made to generalize the results to other populations. Second, one must interpret the findings of the ERP with caution in light of the low reliability coefficients reported in Table 2. One must also consider the statistical dynamics of any dichotomous forced-response instrument and the challenge to achieve acceptable reliability coefficients with only 64 item stems. DeVellis (2012) shared that, “a measure cannot covary if it does vary” (p. 89) highlighting the difficulty of establishing high correlations between split samples of dichotomous variables.

Conclusion 1 and 2: Pre-service agricultural educators at Oklahoma State University prefer the coaching role and are more action and learner centered.

The coaching role, which is the dominant role for 88% of teachers in this study, seems to align well with the culture of agricultural education. The strength in coaching is defined as taking place in the real-world context, through collaboration with others, using an applied and risk-taking style, and most often utilizes field projects, role-plays, and simulations (Kolb et al., 2014). In contrast, the expert role, preferred by only 1.7% of teachers in this study, includes integrating new concepts into existing mental frameworks, is analytical and conceptual, utilizes a logical authoritative style, and includes lectures, readings, and written assignments (Kolb, 2015). As agricultural education seeks to become more relevant in the science, technology, engineering, and math objectives of public education, this weakness could prove debilitating in that effort if not addressed and strengthened. Perhaps this lack of preference for subject matter expertise could be leading to the lack of science and math content knowledge found in agricultural educators (Scales, Terry, & Torres, 2009). Kolb (2015) shared that it is possible to develop less preferred roles, but that most often it is more of a matter of willingness to adapt than ability to do so. How do we motivate those very weak in the expert preference to recognize and be willing to expand? Perhaps it is critically important in this population to be more purposeful in resourcing, modeling, and building experiences around the less developed roles.

Kolb et al. (2014) described the ideal educator as one who facilitates high quality learning experiences. Balance of teaching roles best facilitates high quality learning experiences. Therefore, greater attention should be given to those instructional techniques that align with the subject and meaning foci, which include the augmentation of the expert role. Techniques that should receive additional attention in course schedules should include: (a) lecture, (b) literacy strategies, (c) model critiques, (d) contextual teaching and learning strategies, (e) core curriculum integration, and (f) the use of abstraction guides.

Somewhat tangential to the discussion of teaching and learning, what implications does this strong preference for coaching have on teacher recruitment in Oklahoma? Park and Rudd (2005) noted that an agriscience teacher's decision to teach is based on both social cognition and their personal expectancies and values. Is it possible that this homogeneity of educator role preference is creating a cycle that is systematically attracting more of the coaching style and repelling those who prefer other roles such as expert or evaluator? An examination of other disciplines could determine if other disciplines are more effective in recruiting a more balanced educator due to the methods and or nature of their program. Why is it that we have such a strong coaching preference in our pre-service teaching cohort? The answer to that questions warrants attention.

Conclusion 3: Pre-service agricultural educators at Oklahoma State University are not balanced in their role preferences.

Moore (1999) explained that high quality instruction is occurring under the banner of experiential learning, but that when you truly go beyond the rhetoric and view what is happening on the ground inadequacies can be found. This lack of attention to subject matter expertise, facilitation, and evaluation could be one of those issues. Kolb (2015) found that teachers tend to teach the way they were taught. "With practice both learners and educators can develop the flexibility to use all roles" (p. 306) to create more powerful and enduring learning. How are agricultural education teacher education programs purposefully providing structured practice in each of the four modes? First, it is critical that teacher education programs make clear the pragmatic roles teachers must play in facilitating experiences. Second, using the ERP supports students in bringing about awareness of the potential gaps and areas of strength and highlights specific teaching techniques to augment the four roles.

Conclusion 4: The ERP did not perform at an acceptable reliability level in this population and needs further psychometric analysis and development prior to widespread use.

The ambiguity of experiential learning serves as the greatest weakness of the theory (Roberts, 2012). The ERP provided valuable progress in making clear the role of the teacher when learning experientially. A complimentary metric for the ERP theory is extremely valuable in making students aware of their personal preferences and needs for development. As is the case with any newly designed instrument, it requires confirmation in various samples, psychometric analysis, and continual performance improvement.

The original 96-item instrument that utilized a 7-point Likert-type scale yielded strong initial reliability scores. The decision to reformat the questions to a dichotomous forced-response format rendered the instrument unreliable. Variability is a desirable quality of any measurement scale (DeVellis, 2012). The ERP failed to discriminate differences in the underlying construct attributes in our population, which will ultimately impact the utility of the instrument. The ERP must either include more questions or provide additional responses for each stem to achieve that variability. Perhaps each of the 64 stems utilized in the ERP should be developed as an individual item and return to the 7-point Likert-type scaled response utilized initially. A new version of the ERP in this format should be analyzed through factor analytic methods to better confirm the four role structure, provide more complex educator profiles, and increase reliability.

Recommendations for Practice

The strong preference for the coaching role, and the lack of balance, were surprising to the teacher education faculty at Oklahoma State University. Despite the psychometric challenges of the ERP, it should be administered to pre-service teachers in order to make apparent the critical role a teacher plays in facilitating experiences. Creating pre-service teacher awareness of their preferred role, as well as roles that they are not strong in, supports the felt need for training in instructional techniques and methods. It is recommended that the theory and praxis of the ERP, which provides a framework for good teaching in experiential settings, be made transparent in all teaching methods and techniques conversations. The transparent alignment of teaching techniques to experiential learning will assist a very strong coaching cohort of pre-service teachers and will compliment their journey towards balance. Third, teacher education faculty should be purposeful in modeling the expert, facilitator, and evaluator roles.

Recommendations for Research

Most importantly, it is essential that research be conducted to strengthen the ERP for use in agricultural education. It is recommended that an expanded instrument be created that utilizes the 64 stems and a 7-point Likert-type scale to increase variability. That instrument should then be distributed to a random sample of agricultural educators and factor analytic methods employed to explore further the internal structure and item performance. That analysis would inform researchers on potential stem deletions to make the instrument short and more reliable. Once reliability and validity are achieved, this instrument should be utilized and confirmed in the agricultural education community.

Utilizing a reliable ERP, researchers could explore if the dominance of the coaching role was specific to Oklahoma. It would be interesting to test the hypothesis that pre-service teachers reflect the dominant educator role profile of the state, and if those state profiles differ. Research could also explore if the dominant coaching role was unique to agricultural education, or do all teachers share this preference. Do educators in English, math, science, history, and other vocational areas have similarities in educator role preferences or are roles unique to the individual. A discriminant analysis seeking to predict placement in one of many teaching groups using the ERP score would shed light on the motivations and tendencies of various educators.

Finally, the lack of balance in Oklahoma pre-service educators begs the question, “What interventions lead to improved balance?” Does an educator become more balanced the longer they teach? Do certain courses and

strategies breed balance more quickly than others? This research question is valuable in developing agricultural educators that can facilitate high quality learning experiences.

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Student Teaching Changed Me: A Look at Kolb's Learning Style Inventory Scores Before and After the Student Teaching Experience

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Abstract

Student teaching as the culminating experience of a teacher preparation program has been shown to be of great importance in the preparation of pre-service agricultural educators (Harlin, Roberts, Mowen, Edgar, & Briers, 2007; Roberts, Mowen, Edgar, Harlin, & Briers, 2007; Kitchel & Torres, 2006, 2007; Myers & Dyer, 2004). Kolb's Learning Style Inventory (KLSI) is an instrument designed to examine individual preference for learning in four learning modes: active experimentation (AE), reflective observation (RO), concrete experience (CE), and abstract conceptualization (AC). In addition, the KLSI examines learning preferences in the dimensions of grasping and transforming experience. This descriptive study examined the KLSI scores for two semesters of student teachers (N = 37) from Texas A&M University at both the beginning and end of their student teaching experience. Student teachers were observed as falling into all nine learning styles as indicated by Kolb and Kolb (2013) at both the beginning and end of the student teaching experience. Results indicated that there was wide range of changes in individual student teachers. Active experimentation was the learning mode showing the greatest amount of change among the population, and changes in the group were more apparent in the dimension of transforming experience than in grasping experience.

Introduction

Examinations of the importance of the student teaching semester have shown that, for many student teachers, changes occur in thoughts regarding pedagogical delivery, content knowledge, and teaching intent during this experience (Harlin, Roberts, Briers, Mowen, & Edgar, 2007; Myers & Dyer, 2004). Understanding change during student teaching, and which groups are most influenced by the experience may be an important factor in teacher educators decisions with placement decisions and preparing pre-service teachers for the experience (Darling-Hammond & Bransford, 2007).

Student teaching meets the requirements of a High-Impact Experience (HIE) as set forth by Kuh (2008). HIEs have been shown to have an impact on the way individuals take in and process new information (McKim, Latham, Treptow, & Rayfield, 2013). Understanding the changes which occur during a HIE can provide insight into the quality of the preparation participants received in order to fully embrace the experience (Kuh, 2008). Because of the nature of student teaching as a HIE, it is important to look at the ways in which the student teacher is affected by the experience.

Kolb's Learning Style Inventory (KLSI) has been found to be an accurate measure of an individual's preference for grasping and transforming information during learning (Kolb & Kolb, 2013). Researchers have found that using KLSI as an indicator of the learning preferences for a particular group can help explain their preferred learning delivery style (Kolb & Kolb, 2005a). The KLSI instrument has been found as a stable measure of learning style preference (Kolb & Kolb, 2005a). Alice Kolb (2005a) stated, "experiential learning theory hypothesizes that learning style is situational, varying in response to environmental demands" (p. 15).

One method for examining change would be determining the change in the KLSI score for student teachers from the beginning of their student teaching experience to the end. This study examined changes in student teachers KLSI scores from the beginning to the end of a 12 week student teaching experience. To determine what changes occurred in student teacher learning style over the course of a student teaching semester, we

administered the KLSI version 3.2 to two consecutive semesters of agricultural education student teachers at both the beginning and the end of their student teaching experience.

Theoretical Framework

This study was rooted in Kolb’s (1984) Experiential Learning Cycle, which is based on the Kolb’s (1984) experiential learning theory (ELT). Kolb proposed that learning is a cyclical process, which may be entered at any point, and posited that individuals differ in the ways they prefer to grasp and transform new information (Kolb, 1984, 2015; Kolb & Kolb, 2009). This model is based on the premise that learning is a dynamic interaction between the learner, the methods through which information is gathered, and the methods by which information is processed in the mind (Kolb, 1984, 2015).

Kolb (1984) defines four learning modes through the experiential learning cycle: active experimentation (AE), reflective observation (RO), concrete experience (CE), and abstract conceptualization (AC). The continuums are shown between preferences for AE or RO in relation to the dimension for grasping experience, and as a continuum between CE and AC in relation to transforming information, as shown in Figure 1.

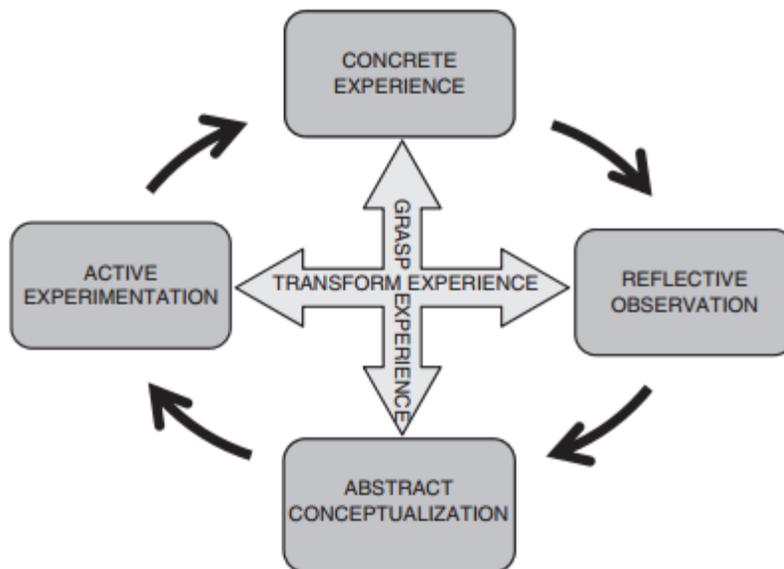


Figure 1. Kolb & Kolb’s (2009) Experiential Learning Cycle. Reprinted with permission.

Kolb (1984) described each of the anchor points on the continuums as the extent to which individuals had preferences for each of the characteristics, saying that learning is the “generalized differences in learning orientation based on the degree to which people emphasize the four modes of the learning process” (p. 26). As the KLSI instrument was developed in alignment to this framework, our study operated based on and within the parameters of the theory.

Review of Literature

To accurately examine the change in student teacher learning preferences during the student teaching experience, we determined that an examination of the relevant literature related to student teaching experiences in agricultural education, influence of learning styles, and high impact experiences was crucial to understanding the objectives of this study.

Student teaching in agricultural education has been studied from numerous perspectives. The experience has been approached by researchers to gather information about the student view of the experience (Fritz & Miller, 2003; Harlin, Edwards, & Briers, 2002; Knobloch, 2006; Roberts, et. al., 2007; Whittington, McConnell, & Knobloch, 2006), cooperating teacher expectations and perceptions (Deeds, Flowers & Arrington, 1991; Thobega & Miller, 2007; Young & Edwards, 2005), the importance of the relationship between student teacher and cooperating teacher (Edwards & Briers, 2001; Kitchel, 2006; Kitchel & Torres, 2006, 2007) and the broader impact of student teaching experiences in agricultural education (Stripling, Ricketts, Roberts, & Harlin, 2008).

Overall, the outlook of student teachers on their experience has been found to be positive. The findings of Harlin, et. al. (2007) and Whittington, et. al. (2006) echo the earlier conclusions of McGhee and Cheek (1990) who noted that agricultural education graduates believed their formal preparation for teaching to be above average. With regard to cooperating teachers, Myers and Dyer (2004) cited a need for research related to cooperating teacher requirements and expectations. Since that time, this topic has been examined in order to develop a list of appropriate factors that would lead to better equipped cooperating teachers (Roberts, 2006).

Relationships between cooperating teachers and student teachers have been found to be important to the overall success of the student teaching experience. Kitchel and Torres (2006, 2007) noted that the cooperating teacher is the most important factor contributing to a favorable student teaching experience. In addition, they examined the importance of personality as a factor in student teacher relationships, finding it to be a crucial factor driving the success of a student teacher placement (Kitchel, 2006).

In addition to gathering perceptions of the student teaching experience and relationships between student teachers and cooperating teachers, the impacts of student teaching experiences have also been examined. Stripling et. al. (2008) compared the efficacy scores of student teachers before and after the student teaching experience, and noted increases in efficacy for student engagement, instructional strategies, and classroom management. Although the importance of student teaching has been cited, not all evidence suggests that it is paramount to novice teacher success. In an examination of factors important to novice teacher efficacy, Knobloch and Whittington (2002) found that student teaching experience was not the factor contributing the most to increased efficacy.

Research into experiential learning in agricultural education has often related to the work of theorists like Dewey (1910), Joplin (1981), and Kolb (1984). Kolb's (1984) experiential learning model was tied to his belief that people have predisposed preferences for how they grasp new information and how they process that information into acquired knowledge. To further examine the topic, Kolb developed the Learning Style Inventory (KLSI) as an assessment of individual preferences.

Some researchers have concluded that learning style cannot be conclusively used as an assessment of overall learning capabilities of an individual (Pashler, McDaniel, Rohrer, & Bjork, 2008). However, Kolb & Kolb (2005b, 2009) posit that learning style is an important indicator of preference for learning, and subsequent engagement in the learning process. Many learning style assessments are currently used, including the Gregorc (1979) Learning Style Delineator, VARK Assessment (Fleming, 2001), Dunn & Dunn (1989) Learning Styles Inventory, and the KLSI (Kolb, 2013). Of the learning style inventories that exist, only the KLSI has capacity for measuring both the grasping and transforming dimensions of learning preference (Kolb & Kolb, 2013).

Examining personal student teacher characteristics as a factor in the student teaching experiences is not a new concept. Kitchel and Torres (2006, 2007) examined the pairing of student teacher and cooperating teachers based on the Myers-Briggs Type Indicator (MBTI). Whittington and Raven (1995) considered the importance of learning and teaching style in a study of pre-service teachers in the Northwest, concluding "there is a need for teacher educators to explore the different types of students and to discover the learning styles and thus teaching

styles associated with those students” (p. 16). Learning styles for pre-service teachers as a factor in determining critical thinking abilities has also been examined (Myers & Dyer, 2004; Rudd, Baker, & Hoover, 2000).

Student teaching fulfills the requirements for high impact educational practices as set forth by Kuh (2008). Kuh outlined high impact experiences (HIE) as a form of experiential learning designed to “challenge student to develop new ways of thinking about and responding immediately to novel circumstances as they work side by side with peers on intellectual and practical tasks, inside and outside the classroom, on and off campus” (p.15). In his description of the importance of HIEs, Kuh (2008) outlines that HIEs can alter the way in which student interact with each other, the content, and can impact the way they gather and process information.

To summarize the relevant literature, student teaching is an important event in the development of a pre-service agricultural educator, understanding the importance of learning style could be helpful in examining factors related to student teaching, and the nature of student teaching leads us to believe that there is the potential for student teaching, as a high impact experience, to be a factor in potential change in KLSI score among student teachers.

Purpose and Objectives

The intent of this study was to describe changes in the KLSI score for student teachers from the beginning to the end of their student teaching experience. To meet this purpose, the study was guided by the following objectives:

1. Identify KLSI scores and learning styles for agricultural education student teachers at the beginning of their student teaching experience
2. Identify KLSI scores and learning styles for agricultural education student teachers at the end of their student teaching experience
3. Describe changes in KLSI scores for agricultural education student teachers from the beginning to the end of their student teaching experience

Methods

This study employed the use of descriptive survey methods. According to Fraenkel, Wallen, and Hyun (2012), the purpose of a descriptive study is to “describe a given state of affairs as fully and carefully as possible” (p. 15). To fulfill the purpose and meet the objectives of this study, we carefully outlined the procedures for data collection and analysis.

The population of this study were the Texas A&M University agricultural education student teachers from the fall 2014 and spring 2015 semesters ($N = 37$). Participants completed the KLSI on the final day of pre-student teaching instruction, three days before their student teaching experience began, and again at the end of semester conference, three days after the end of their student teaching experience. Due to errors in instrument completion, $n = 3$ of the instruments were deemed to contain inaccurate information and both pre and post student teaching scores for those participants were excluded from the analysis, yielding a 91.9% useable response rate. The complete pre and post assessments from $N = 34$ participants were included in the analysis.

The instrument we used for this study was the paper version of Kolb’s Learning Style Inventory, version 3.2 (Kolb & Kolb, 2013), which is commercially available from Haygroup. The format of KLSI v. 3.2 is a forced-choice response to 12 instrument items. Each item contains a sentence prompt and asks respondents to rank their preferences for four answer choices, which correspond to the four learning modes of Kolb’s (1984) Experiential Learning Theory (ELT). Respondent rankings are ordinal from 4 “most like me” to 1 “least like

me” (Kolb & Kolb, 2013). The descriptions for each of the modes of learning are outlined in the *KLSI version 3.2 workbook* (Kolb & Kolb, 2013), as shown in Table 1.

Table 1
KLSI v. 3.2 description of modes of learning (Kolb & Kolb, 2013)

Learning Mode	Description	Characterized by
Active Experimentation	Learning by doing	Ability to get things done, take risks, and influence people and events through action
Concrete Experience	Learning by experiencing	Learning from specific experiences, relating to people, being sensitive to feelings and people
Reflective Observation	Learning by reflecting	Observing carefully before making judgments, viewing issues from other perspectives, looking for the meaning of things
Abstract Conceptualization	Learning by thinking	Analyzing ideas logically, planning systematically, acting on an intellectual understanding of a situation

Validity of the KLSI v. 3.2 has been widely established for use in the field of education (Kolb & Kolb, 2005). Validity was determined to be acceptable for the purposes of this study. Previous measures of internal reliability for the four learning modes included in the KLSI range from $\alpha = 0.77$ to $\alpha = 0.84$ (Kolb & Kolb, 2005a). As such, we determined the internal reliability to be suitable for use in this study. Of specific interest to this study, which employed the use of the KLSI as a pre and post measure, was the test-retest reliability of the instrument.

Test-retest reliability for the instrument was calculated using Cohen’s kappa coefficient, and is reported in instrument documentation to be above $\kappa = 0.90$ for multiple research studies (Kolb & Kolb, 2005a). Although test-retest reliability is sufficient for the purposes of this study, several studies reported lower test-retest reliability estimates (Kolb & Kolb, 2005a). In these cases, Kolb states “learning style is situational, varying in response to environmental demands; changes in style may be the result of discontinuous intervening experiences between test and retest” (Kolb & Kolb, 2005a, p. 16). As the purpose of this study was to determine if changes occur in KLSI score with the intervening variable of a student teaching experience, the test-retest reliability was deemed to lend to the strength of analysis.

Upon the completion of the KLSI, respondents yield calculated scores highlighting their preference for each of the four learning modes (AE, RO, AC, CE), along with a score for preferences in grasping (AC - CE) and transforming (AC – CE) experience. In addition to the raw scores of the KLSI, Kolb and Kolb (2013) identify nine categorized learning styles which are based on an individual’s scores for grasping and transforming experience. The nine learning styles of KLSI v. 3.2 replace the four learning styles of the KLSI v. 3.1 (Kolb, 2015), and are based on preferences on both the grasping and transforming continuums. Scores for learning style are scaled to reflect normative groups, with a score of +7 as an equal preference between the dimensions for grasping experiences (AC-CE) or transforming experiences (AE-RO). The nine learning styles in relation to KLSI scores are shown in Figure 2.

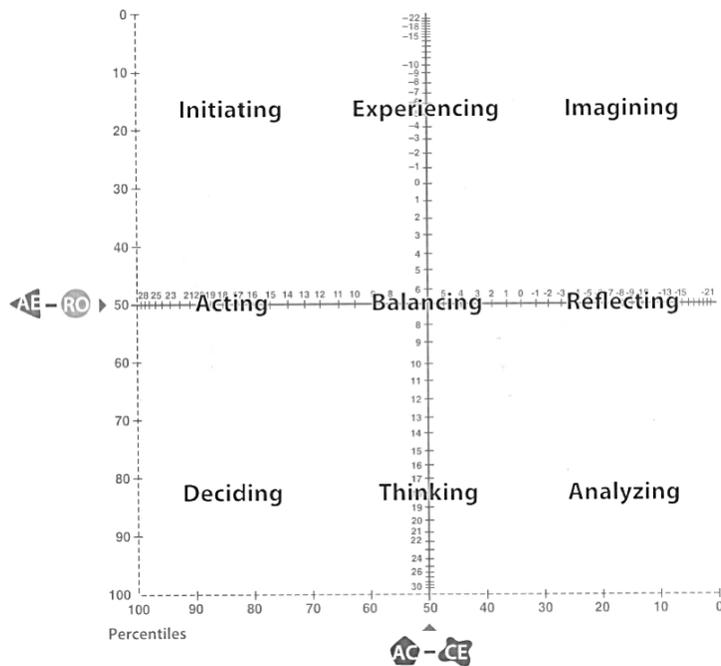


Figure 2. Kolb's nine learning styles as related to KLSI scores on grasping and transforming dimensions. Copyright Haygroup, 2013. Reprinted with permission.

Scoring the KLSI was completed by hand, with the assistance of an Excel spreadsheet, using the guidelines set by Kolb and Kolb (2013). Scores were calculated for each of the four learning modes. Scores for each of the learning modes range from 12 (lowest rank given on all instrument items) to 48 (highest rank given on all instrument items). In addition, scores for grasping knowledge (AC-CE) and transforming knowledge (AE-RO) were calculated per the guidelines of Kolb and Kolb (2005a). Scores for grasping and transforming data range from -36 to +36. Resulting data were analyzed using IBM® SPSS version 22.

Findings

On the KLSI assessment taken prior to student teaching, we found that the more student teachers were classified in the initiating ($n = 8$) and analyzing ($n = 6$) learning styles than any others, with Acting and Balancing ($n = 5$) closely following in number of students. It is worth noting that all nine of Kolb's (2013) learning styles were represented in the population. Frequencies and percentages of student teacher learning styles before the student teaching experience are shown in Table 2.

Table 2.

Learning Styles of Pre-service Agricultural Educators Before Student Teaching (N = 34)

Learning Style	<i>f</i>	%
Initiating	8	23.5
Thinking	6	17.6
Acting	5	14.7
Balancing	5	14.7
Analyzing	3	8.8
Reflecting	3	8.8
Experiencing	2	5.9
Deciding	1	2.9

Note. Learning styles were calculated using the guidelines of Kolb and Kolb (2013)

The highest mean score by learning mode was active experimentation ($M = 39.26$, $SD = 5.41$) while the lowest mean score for the pre-student teaching instrument was in concrete experience ($M = 24.06$, $SD = 5.24$). The overall mean score for the preferences for grasping information was $M = 4.44$ ($SD = 10.79$) on a scale from -36 to 36. Kolb and Kolb (2013) set the balance point for equal preferences between ends of the dimensions for grasping and transforming experiences at +7. Although answers varied among participants, as a group there was a slight preference for grasping experience through concrete experience over abstract conceptualization. The mean score on the scale for transforming information was $M = 11.15$ ($SD = 9.88$), indicating a slight preference in the group for transforming information through active experimentation rather than reflective observation. Scores for each learning mode along with scores on the grasping and transforming continuums are shown in Table 3.

Table 3.

KLSI Scores for Pre-service Agricultural Educators Before Student Teaching (N = 34)

Construct	Min	Max	M	SD
Abstract Conceptualization	16	47	28.53	6.74
Concrete Experience	18	36	24.06	5.24
Active Experimentation	25	47	39.26	5.41
Reflective Observation	17	42	28.47	6.06
Grasping Experience (AC-CE)	-20	29	4.44	10.79
Transforming Experience (AE-RO)	-11	26	11.15	9.89

Note. Calculated scores can range from 12 – 48 on learning modes and -36 to +36 on experience dimensions. Equal balance between ends of the continuums for transforming and grasping experience dimensions is set at +7 (Kolb & Kolb, 2013).

At the end of the student teaching experience, there were proportionately more student teachers whose KLSI learning style was categorized as initiating ($n = 12$) than the other eight learning styles, although all nine learning styles were again represented in the population. The breakdown of learning styles for student teachers at the end of the student teaching experience is shown in Table 4.

Table 4.

Learning Styles of Pre-service Agricultural Educators After Student Teaching (N = 34)

Learning Style	f	%
Initiating	12	35.3
Deciding	6	14.7
Imagining	4	11.8
Experiencing	4	11.8
Acting	3	8.8
Analyzing	2	5.9
Reflecting	2	5.9
Thinking	1	2.9
Balancing	1	2.9

Note. Learning styles were calculated using the guidelines of Kolb and Kolb (2013)

Analysis of KLSI scores for learning modes and the dimensions of grasping and transforming experiences revealed high mean scores for both active experimentation ($M = 32.38$, $SD = 10.24$) and abstract conceptualization ($M = 32.29$, $SD = 10.42$). With regard to the dimensions of grasping and transforming experiences, there was a slight preference toward abstract conceptualization in the grasping domain ($M = 0.24$, $SD = 13.03$) and a continuing slight preference toward active experimentation ($M = 9.15$, $SD = 12.60$) in the dimension related to transforming experiences. It is important to note the relatively high standard deviations for the observed KLSI scores after student teaching. The KLSI scores for all constructs is shown in Table 5.

Table 5.

KLSI Scores for Pre-service Agricultural Educators After Student Teaching (N = 34)

Construct	Min	Max	M	SD
Abstract Conceptualization	13	47	32.29	10.42
Concrete Experience	16	41	26.79	6.53
Active Experimentation	14	47	32.38	10.24
Reflective Observation	17	47	28.53	7.57
Grasping Experience (AC-CE)	-21	26	0.24	13.03
Transforming Experience (AE-RO)	-20	27	9.15	12.60

Note. Calculated scores can range from 12 – 48 on learning modes and -36 to +36 on experience dimensions. Equal balance between ends of the continuums for the transforming and grasping experience dimensions are set at +7 (Kolb & Kolb, 2013).

Analyzing the absolute value of the change in KLSI scores for each of the learning modes revealed the average change in score from the pre student teaching assessment to the post student teaching assessment. The learning mode showing the greatest overall mean change was active experimentation ($M = 10.29$, $SD = 8.47$). The learning mode showing the smallest overall mean change was concrete experimentation ($M = 6.03$, $SD = 5.31$). Complete change in KLSI scores are shown in Table 6.

Table 6.

Change in KLSI Scores from Beginning to End of Student Teaching Experience (N = 34)

Construct	Min	Max	M	SD
Change in Abstract Conceptualization	0	25	8.24	7.25
Change in Concrete Experience	0	20	6.03	5.31
Change in Active Experimentation	0	26	10.29	8.47
Change in Reflective Observation	0	25	7.24	5.84
Change in Grasping Experience (AC-CE)	0	28	6.68	5.72
Change in Transforming Experience (AE-RO)	0	32	8.00	7.15

Note. Change was calculated as the absolute difference between scores from pretest to posttest. Equal balance between constructs on dimensions is set at +7 (Kolb & Kolb, 2013).

A broad range of changes was experienced among individual respondents. For every learning mode, there was at least one student teacher who had no change in score from pre student teaching to post student teaching assessment. A careful analysis of the entire data set revealed that there were no student teachers who had identical scores in all dimensions from their pre student teaching to their end of student teaching. The graphed learning styles from beginning of student teaching to end of student teaching is shown in Figure 3.

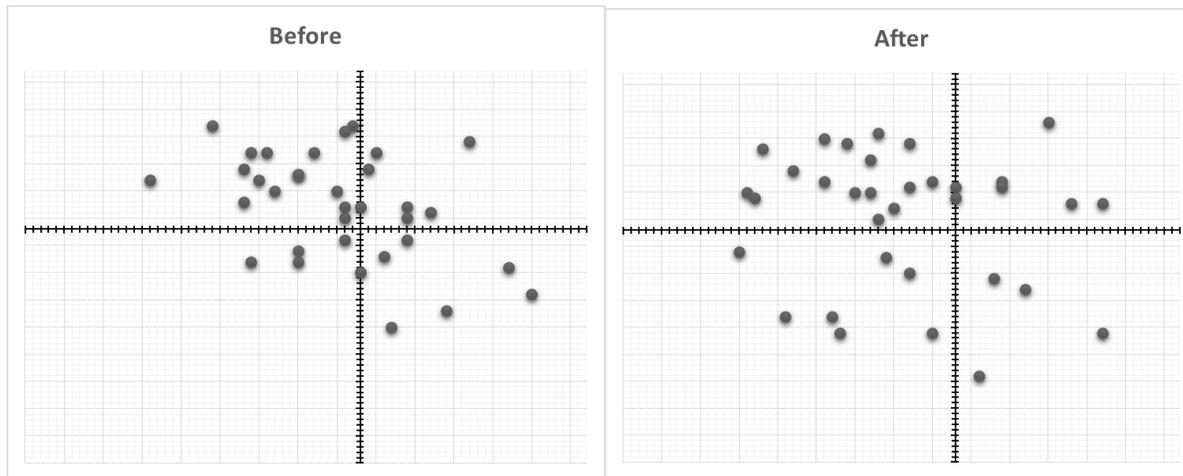


Figure 3. Complete KLSI learning style scores before (left) and after (right) student teaching. Data points in this figure are not scaled to the normative scale of KLSI style grid

Conclusions/Implications

The findings of this study lead to the conclusion that, at least for some student teachers, change in KLSI learning style, preferences for learning mode, and preferences for grasping and transforming experiences changed from the beginning to the end of the student teaching experience. Kolb and Kolb (2005a) stated the importance of examining intervening variables when changes in KLSI scores were observed with repeated tests, stating that these experiences could be factors contributing to the change. For many of the student teachers in this population, change was evident. Although in many cases change occurred, it is important to note that examining the nature of change, or if change in learning style is beneficial or desirable, was not the intent of this study. There is no evidence linking change in KLSI score to growth as an individual. Our intent was simply to determine if the intervening activity of student teaching led to change in these cohorts of student teachers.

The wide range of change scores leads us to conclude that the amount of change occurring for individual student teachers varies. Kuh (2008) suggested that high-impact experiences are most effective and lead to the most growth in students when they are prepared for the potential impacts of those experiences. This finding leads us to wonder what the factors are that drive change in student teachers during the course of the student teaching experience, and if in fact change in a specific direction indicates growth or regression. This concept has potential implications for both pre-service teachers and teacher educators. Student teachers may be able to gain more from their student teaching experience if they are prepared for the potential impacts of the experience on their learning preferences. In addition, teacher educators may be able to better capitalize on the strengths of student teaching as a HIE, providing a framework for developing student teaching assignments and reflection activities geared toward development in Kolb's (2013) learning modes.

Another potential explanation for the broad range of change scores from beginning to end of the student teaching experience in this population could be the overall quality of the student teaching experience. We suggest using the change in KLSI to further examine the factors of a student teaching experience which contribute to change in KLSI score. In addition, these results could lend to the need for placing student teachers in cooperating centers that are designed to stretch their thinking and insight change in their learning style.

There is no "ideal" learning style related to automatic success in education, or any particular occupation (Kolb & Kolb, 2013), but understanding which learning modes are most important to foster in pre-service teachers

could be a starting point for making placement and assignment decisions during student teaching that could stimulate change in those areas as part of a larger conversation about learning styles related to effective teaching. We suggest continued examination of the impacts of KLSI score as a factor contributing to teaching preferences.

As a collective group, the student teachers in this population showed the most change in the active experimentation learning mode. This leads to the question: is there something about the student teaching experience that would translate to a change in preference for transforming information through active experimentation? It is important to note that while this area indicated the highest amount of change, we did not examine directional changes in learning modes, only that change occurred. The overall mean score for active experimentation did experience a decrease from the pre student teaching assessment to the post student teaching assessment, indicating that there may be something in the student teaching process that could lead to decreases in active experimentation and a shift toward reflective observation.

Concrete experience was not only the learning mode exhibiting the smallest amount of change ($M = 6.03$), but also had the smallest standard deviation ($SD = 5.31$). This finding leads us to suggest that for this population, preference for concrete experience was more stable than the other three learning modes. Further research should be conducted to explore this learning mode and the likelihood of flexibility in this area.

The greatest range related to change in KLSI scores was observed in the dimension of transforming experiences, with students exhibiting up to a 32 point shift in learning preference between active experimentation and reflective observation. Less overall change and smaller range of change was found on the grasping experience dimension than the transforming experience dimension. This could be indicative of something during the student teaching experience which facilitates a need for student teachers to adapt the way in which they transform experiences.

Based on the findings of this study, we suggest that the KLSI continue to be used as an indicator of student teaching learning preferences, and that more data related to the changes in KLSI score during the student teaching experience be examined. Using the KLSI as a tool for preparing student teachers could allow teacher educators to better evaluate the changes occurring during the experience. As student teachers become aware of their own learning preferences, they could increase their awareness of the personal changes which occur during their student teaching experience. In addition, understanding the changes occurring in student teaching could prove useful in examining programmatic effectiveness in areas which allow student teachers to develop in the four learning modes of the KLSI.

Recommendations

We realize that we have placed much of the credit for this study on the shoulders of the KLSI. We also realize that this a limitation to the study which can serve as a call for future research. We recommend further research be conducted using other learning style assessments during the student teaching experience to broaden the literature base in this area. Further, we recommend this study be replicated in different settings. Perhaps there are differences in student teaching experiences based on length of time, time of year (spring or fall), or structure of the student teaching experience (on-campus student teaching block) that may not be accounted for by using the KLSI.

We recommend testing the KLSI as a means to more effectively place student teachers with cooperating teachers during the student teaching experience. Further research should focus on using this tool to improve the student teaching experience for student teachers as well as cooperating teachers. This may include further quantitative analyses, longitudinal studies, or even a mixed methods approach to capture qualitative data.

Student teaching has been the capstone experience for teacher education programs since their inception. Documenting high impact experiences can be difficult. We recommend further study and linkage to HIE practices in higher education to better capture the “high impact” nature of the student teaching experience. This has the potential to strengthen our relationships with stakeholders in agricultural education and generate additional funding for innovative programs that could incentivize student teaching and transform our current student teaching model for future generations.

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A Comparison of Experiential Learning Techniques & Direct Instruction on Student Knowledge of Agriculture

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Introduction & Need for Study

Agricultural literacy is far from a new phenomenon in relation to its importance in today's society; however, the gradual decline of agricultural literacy from generation to subsequent generation is alarming. Due to a variety of factors, the United States has drastically shifted from a once dominantly agrarian society to the opposite end of the spectrum (Riedel, 2006). The United States Environmental Protection Agency (EPA) reported that now, only 2% of the U.S. population live on farms as compared to 43% in 1953 (Tarmann, 2003; EPA, 2013). Birkenholz, Harris, and Pry (1994) acknowledged agriculturally relevant technologies have made production more efficient than ever before which is another factor that has contributed to fewer farms. With fewer people living on farms, coupled with people moving to more populated areas, a substantial chasm is created between the farm and the table and can have adverse effects in achieving an agriculturally literate population (Kovar & Ball, 2013).

Agricultural literacy itself is a vast concept; including, but not limited to agriculture's relationship with the environment and natural resources, agricultural policies, plant and animal production, and the economic impacts of agriculture (Frick, Kahler, & Miller, 1991). With the decline of an agriculturally literate population, the role and perceptions of agriculture has also changed in society as well. Many people tend to associate the term "agriculture" with either farming or ranching only (Terry, Herring, & Larke, 1992). Coupled with conflicting opinions in mainstream media regarding agricultural production and societal concerns with food labeling, agriculture has been painted in a negative light for those who are not agriculturally literate (Balschweid, Thompson, & Cole, 1998). Unless the masses are agriculturally literate, they will be unable to fend off the onslaught of emotional negativity produced through various media outlets (Kovar & Ball, 2013).

One strategy for altering agricultural perceptions and increasing agricultural literacy, in addition to other subject matters, is implementing agricultural centered, school-based lessons (Fisher-Maltese, 2014). The National Research Council's publication (1988) *Understanding Agriculture: New Directions for Education* stated "agriculture is too important a topic to be taught only to the relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies" (p. 1). Blair (2009) pointed to the many benefits of introducing agriculturally centered lessons to students. "[In agriculture], food can no longer be viewed as a mere commodity for consumption; we are brought into the ritual of communal goodness that is found at the intersection of people and plants" (Blair, 2009, p. 18). The author stated exposure to agriculture can change student perceptions and these lessons help contextualize science with the natural world and promotes linkages with nature and concepts beyond themselves.

A large and growing body of literature has identified experiential learning as an effective element in teaching agriculture as well as other closely related scientific related fields (Northern Illinois University, 2011). Experiential learning is not a new concept, and it is recognized to be effective in assisting students solve real world problems and practices (Northern Illinois University, 2011). Experiential learning is widely championed because of its challenging nature and the complexity of integrating different aspects of learning by doing and reflection (Penny, Frankel, & Mothersill, 2012). Experiential learning also makes the case for critical thinking and problem solving by being heavily centered on student involvement rather than memorization (Northern Illinois University, 2011). Penny et al. (2011) concluded their publication by stating "(...) lecture format for

transmitting knowledge can no longer be the only pedagogical approach used in academic settings. Experiential learning opportunities that promote use of cognitive, affective, psychomotor (...) ways of knowing are more reflective of learners in the new millennium” (p. 7).

Literature Review & Theoretical Framework

The National Research Council’s (1988) report *Understanding Agriculture: New Directions for Education*, was initially published in response to the declining profitability of American farms and decreasing number of agricultural education enrollment (Kovar & Ball, 2013). This publication is widely accepted as the foundation of agricultural literacy concepts. The goal of the report was aimed at assessing and improving agricultural education programs in secondary education in the United States (Kovar & Ball, 2013). Based on the National Research Council’s publication, a three-part definition was developed of what competencies an agriculturally literate person should possess. First, “[agriculture’s] history and its current economic, social, and environmental significance” (p. 8-9), secondly, an agriculturally literate person should have enough knowledge to make informed decisions regarding diet and health, and finally, “have [enough] practical knowledge needed to care for their outdoor environments, which include lawns, gardens, recreational areas, and parks” (p. 9). One of the council’s principal findings was agricultural literacy was an issue in society and contended agriculture “is too important a topic to be taught only to the relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies” (National Research Council, 1988; p. 1).

Since the furnishing of the definition of agricultural literacy, many studies have been conducted to assess knowledge of agriculture among teacher and student populations, with most emphasis being targeted at elementary-aged student populations (Kovar & Ball, 2013). Birkenholz, et al. (1994) investigated agricultural literacy among college students. The survey instrument, the authors developed, consisted of three sections: the first consisted of true/false questions that assessed knowledge of agriculture, the second utilized a Likert-scale (1-Strongly Agree, 2-Agree, 3-Neutral, 4-Disagree, 5-Strongly Disagree) that assessed perceptions of agriculture, and the third consisted of demographic data. Birkenholz et al. (1994) reported the mean knowledge score among participants was 68.1%, indicating participants were somewhat knowledgeable of agriculture.

Frick, Birkenholz, Gardner, and Machtmes (1995) and Pense and Leising (2004) further examined agricultural knowledge of students. Frick et al. (1995) examined agricultural knowledge and perceptions by assessing rural and urban inner-city students in the Midwest. Their study totaled 1,121 respondents with 668 being from rural Indiana and 453 respondents from urban Michigan. Their results showed that rural students answered 65% of the knowledge items correctly and the urban student group answered 47.9% of the knowledge questions correctly. Their numbers indicated both rural and urban student groups were not very knowledgeable of agricultural practices, but rural students had more knowledge of agricultural practices than urban students. Pense and Leising (2004) performed a similar study but with a population of 12th graders in Oklahoma. The authors sought to determine the knowledge of the food and fiber systems based on the Food and Fiber Systems Literacy Framework benchmarks for grades 9-12. Their ex post facto research design coupled with purposive sampling assessed 330 general education and agricultural students from five different high schools. Their study also encompassed students in urban, rural, and suburban schools. Their results indicated that, overall, the students exhibited similar levels of knowledge, but were not agriculturally literate based on no school receiving higher than a 49% mean score.

The famous saying ‘tell me and I forget, teach me and I remember, involve me and I will learn’ provides a basis for experiential learning (Northern Illinois University, 2011). Experiential learning builds on the foundation set by John Dewey, Carl Rodgers, and David Kolb and identifies itself as a process of learning which focuses on engaging students through active experimentation and reflection (Baker, Robinson, & Kolb, 2012). In Dewey’s 1938 publication *Experience & Education*, he pointed out the need for experience in education and expressed

that experience can lead to a genuine education. Dewey (1938) stated “that education in order to accomplish its ends both for the individual learner and for society must be based upon experience, which is always the actual life-experience of some individual” (p. 39). David Kolb, stated “learning is the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience” (1984, p. 38). Kolb’s definition of learning lays the foundation for the experiential learning perspective.

Wozencroft, Pate, and Griffiths (2014) explained additional benefits associated with experiential learning. The authors stated experiential learning “[promotes] student engagement, [promotes] an improved atmosphere for making ethical decisions, and the promotion of critical-thinking and problem-solving skills” (Wozencroft et al., 2014, p. 4). There are many definitions and observational objectives for experiential learning, but Penny et al. (2011) gave a very appropriate definition contending its effectiveness in teaching within many disciplines:

The objective of experiential learning is to provide an education that attends in some balanced manner to the student’s need to advance knowledge acquisition and critical judgment, thinking and acting, reflection and engagement, career development and informed citizenship, growth as an individual, and greater connectivity with the larger community (p. 2).

The Agricultural Literacy Framework (Elliot, 1999) (Figure 1) and Kolb’s Experiential Learning Cycle (1984) (Figure 2) were used as the theoretical framework for this study. The agricultural literacy framework model consists of three categories that form and shape knowledge base and opinions of agriculture (Elliot, 1999). The ‘Education’ component consists of formal or non-formal education and news media outlets, the ‘Personal Characteristics’ component consists of gender, ethnicity, home location, and family/friends, and the ‘Participation in Agricultural Activities’ component consists of participation in FFA, 4H, growing plants, or raising animals. Elliot (1999) utilized this model when assessing the awareness and knowledge base of agriculture in Arizona public school teachers. The author found that teachers who received an agricultural literacy educational treatment were more agriculturally literate than those who did not. The author concluded that agricultural education can positively affect a target population’s knowledge and perceptions of agriculture. Duncan and Broyles (2004) similarly pointed out in their study that knowledge of agriculture is influenced by the same factors Elliot (1999) described. The authors found that a systematic approach to educating students about agriculture proved to be successful in expanding student’s knowledge of agriculture.

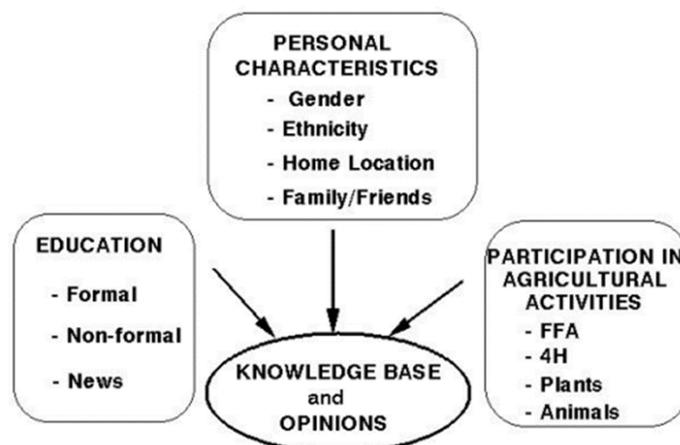


Figure 1. Framework of influences that determine agricultural knowledge and perceptions (Elliot, 1999).

Experiential learning was built on a foundation provided by Dewey and Piaget (Kolb, 1984). In agriculture, experiential learning provides a basis for students to conceptualize and experience the abstractness of

agriculture (Blair, 2009). Kolb's Experiential Learning Model conceptualizes learning from using experience in four components: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Dunlap, Dobrovolny, & Young, 2008). Concrete experience begins with the learner experiencing a situation. Reflective observation requires the learner to examine the concrete experience in order to conceptualize a variety of perspectives to place meaning with the experience. In abstract conceptualization, the learner builds on their reflective experiences to examine and infer logical conclusions from the experience. Finally, active experimentation propels the learner to make decisions and apply concepts to new and future experiences (Dunlap et al., 2008).

Arnold, Warner, and Osborne (2006) sought to examine the use of experiential learning in secondary agricultural education classrooms. Their qualitative study investigated secondary agriculture teachers' familiarity with and implementation of Kolb's Experiential Learning Model. Their study revealed teachers lacked formal knowledge regarding experiential learning and the particular process, but recognized the benefits of experiential learning. Some benefits the participants identified were students retained subject matter better, students were more engaged, and students performed better academically (Arnold et al., 2008).

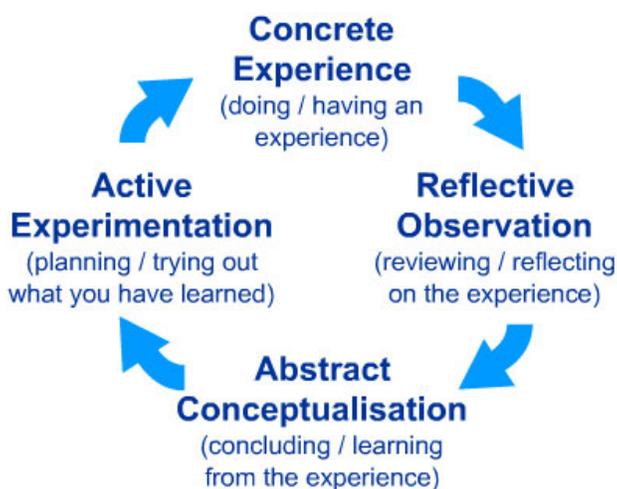


Figure 2. David Kolb's experiential learning model (1984).

By assessing agricultural literacy within relevant populations, researchers gain perspective of the gaps in agricultural knowledge. Elliot (1999) further contended by assessing agriculture awareness of various populations, researchers gain an edge in developing curriculum and identifying effective ways of dispensing agricultural knowledge. By using Kolb's experiential learning model, experiential learning has the potential to aptly teach agricultural concepts to those who are not agriculturally literate. When possible, experiential learning in agriculture allows students to conceptualize how agriculture relates to science and the world around them.

Purpose and Research Questions

With many different potential outlets for inaccurate agricultural facts, agricultural literacy in society has never been more important. The *National Research Agenda: American Association for Agricultural Education's Research Priority Areas for 2011-2015* (Doerfert, 2011) recognized the need for agricultural literacy in Priority Area 1. The author cites the need for an increase in informing the public of agricultural awareness by "understanding of related message and curriculum development, delivery method preferences and effectiveness, and the extent of change in audience knowledge, attitudes, perceptions and behaviors after experiencing an educational program or consuming related information and messages" (p. 8). As educators and researchers, it is vital to stress the importance of agricultural literacy to those outside of the discipline. The purpose of this study

was to quantitatively investigate the level of agricultural knowledge among three groups of private school students. More specifically, this study investigated the differences in agricultural knowledge based on various teaching intervention methods and their effects on increasing agricultural knowledge.

The research questions were:

1. What is the current level of agricultural knowledge among 10th grade biology students?
2. Was there a significant increase in agricultural knowledge test scores in regard to direct instruction and experiential learning techniques?
3. Was there a significant increase in agricultural knowledge test scores between groups based on intervention?

Methodology

The research design was a quantitative, quasi-experimental study using descriptive statistics to investigate the research questions. A nonrandomized control group, pretest-posttest design, were accompanied with various teaching interventions. Quasi-experimental research designs are designs where non-randomization of treatment groups are allowed (Ary, Jacobs, & Sorensen, 2010). These designs are widely used in educational research settings where pre-existing groups (i.e. classrooms) are not left up to the researcher for random assignment (Ary et al., 2010).

Ary et al. (2010) stated that utilizing the nonrandomized control group pretest-posttest design decreases selection bias that could threaten the internal validity of the research design. Ary et al. (2010) stated “the pretest enables you to check on the equivalence of the groups on the dependent variable before the experiment begins” (p. 317). Given the fact that in this design, each group receives the same pretest, threats such as maturation and instrumentation are not serious threats to internal validity (Ary et al., 2010). Also in this design, the non-randomization contributes to the generalizability of the findings because the subjects are unaware the experiment is being conducted with other groups (Ary et al., 2010).

The study occurred during the spring 2015 semester at three (3) private high schools in Mississippi. Private schools were identified as schools that received no state funding and/or are members of the Mississippi Association of Independent Schools. Treatment groups were assigned as either receiving no teaching intervention (control, Group 1), direct instruction (Group 2), or experiential learning (Group 3).

For the two schools that received a treatment, the principal investigator (PI) taught a series of lectures by way of The Biological Sciences Curriculum Study publication, *Nourishing the Planet in the 21st Century* (2007). These lessons consisted of six (6), 45-minute lessons that were contextualized in agriculture focusing on a variety of agricultural topics such as soil properties, plant growth and development, commercial and organic fertilizers and production methods, and the history of agriculture.

For treatment groups, the PI performed various activities with each group on eight different occasions, one day each for pre and post-test administration and six to teach the lessons. Group 2 were taught lessons on six consecutive days (February 9, 10, 11, 12, 18, & 19) via direct instruction in a traditional classroom setting. The PI administered handouts, modified notes, and additional paper materials to accompany the agricultural lessons. Group 3 received modified instruction by incorporating hands-on activities which included fertilizer spreading, experience with soil textures and profiling, and a fully functional high-tunnel for plant growth and fertilizer experiments. Due to weather restrictions, the PI met with group 3 on a more inconsistent basis (February 16,

24, March 3, 24, & April 8) than Group 2. The PI met with Group 1 only twice, once to administer the pre-test and once to administer the post-test.

The target population for this study was 10th grade Biology students. Due to recommendations from the school principal, traditional biology students were unable to be surveyed in Group 1; therefore, the 10th grade advanced biology students were assessed. The accessible population consisted of students who were enrolled in the Biology course, were present at school, and parents who consented for their child to participate. Students who were not present at the time of the pre-test assessments were allowed to participate in the activities/lessons, but did not take the post-test assessment.

Each of the three schools were given the same pre and post-tests at the beginning and end of the study provided by the *Nourishing the Planet in the 21st Century* curriculum. The pre and post-test consisted of 15 multiple choice questions. These questions assessed basic knowledge of plant, soil, and water relationships. The pre and post-tests directions prompted the student to indicate if they are sure, have guessed, or don't have enough knowledge to answer the question correctly. Prior to administering the pre and post-tests, students were informed that both unanswered and/or guessed answers would be marked as incorrect, but were made to feel at ease that incorrect answers held no penalty. At the end of the scheduled teachings, each group received a post-test with different questions from the pre-test, but likewise measured knowledge gained over the course of the teachings in relation to plant, soil, water, and agricultural production and relationships. As with the pre-test, post-test answers that were unanswered or where the student indicated they guessed was counted as incorrect. After collection of the pre and post-tests, the researcher scored each by hand and recorded grades as a percentage out of 100 points.

Results of the surveys were analyzed using appropriate statistics within IBS SPSS[®] Statistics 23. Data were summarized using measures of central tendency. Distribution and frequency of scores along with the means and standard deviations of pre and post-test scores were computed. Missing data were screened to determine if data was missing completely at random (MCAR) and independent samples test were conducted for equality of means and variances. Paired samples t-test were conducted along with multivariate and categorical variables were dummy coded to achieve regression analysis.

Findings

Group 1 assessed 14 students and Group 2 and Group 3 assessed 21 and 22 students; respectively.

Research question one sought to determine the current level of agricultural knowledge among 10th grade biology students. Students completed the pre-test assessment and scores were based on number of questions answered correctly divided by the total questions and the following scale was used to classify level of knowledge out of 100 total points as reported by Terry et al. (1992):

90-100	Superior Knowledge
80-89	Acceptable Knowledge
70-79	Moderate Knowledge
60-69	Minimal Knowledge
< 60	Unacceptably low knowledge

Group 1 students' scores on the pre-test ranged from 20% (3/15 questions correctly answered) to 67% (10/15 questions correctly answered) with a mean score of 36.4%. A large percentage (86%) of the students scored in the 'Unacceptably low knowledge' while the remaining 14% scored in the 'Minimal Knowledge' category.

Group 2 student's scored on a wider range in their current knowledge of agriculture. Their pre-test ranged from 13% (2/15) to 80% (12/15) with a mean score of 43.4%. Similar to Group 1, a large percentage (76%) of the students scored in the 'Unacceptably low knowledge' category while the remaining students scored in the 'Minimal Knowledge' category.

Group 3 student's scores on the pre-test ranged similar to Group 2 students. Scores ranged from 13% (2/15) to 80% (12/15) with a mean score of 45.4%. Before any intervention was conducted, 77% of the students scored in the 'Unacceptably low knowledge' while 14% of students had minimal knowledge, and the remaining 9% fell in the 'Moderate' and 'Acceptable Knowledge' category (Figure 3).

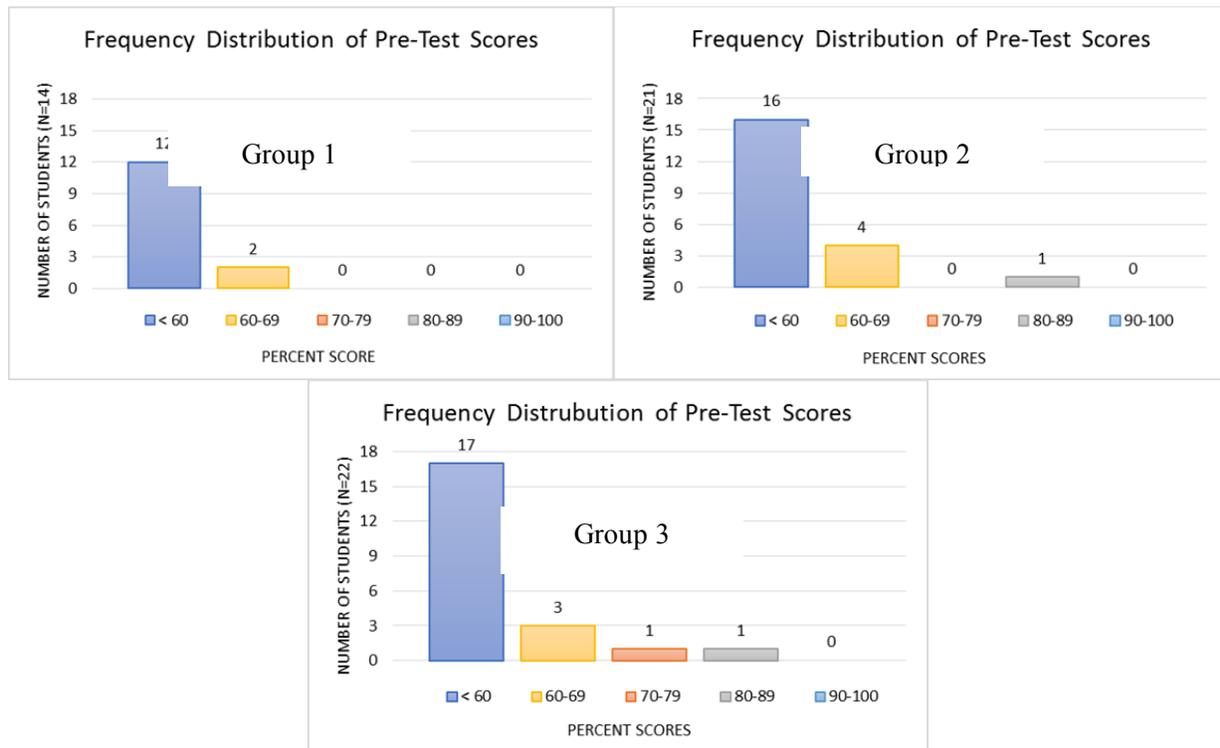


Figure 3. Distribution and frequency of pre-test scores for groups 1, 2, & 3

ANOVA was used to test the equality the means at one time by using the variance between the three groups of students. When comparing the three groups, the output displayed mean pre-test scores between the three groups were not significant ($p = .231$).

Research question two sought to determine if there was an increase in agricultural knowledge among test scores with regard to direct instruction and experiential learning techniques. At the time of the post-test assessment, Group 1 (control) students' scores increased, but still resulted in a low-knowledge of agriculture ($M = 47.6$). Post-test scores ranged from 20% (3/15) to 80% (12/15) in which 64% of scores still resulted in students having an unacceptably low knowledge of agriculture.

After the teaching intervention, on average, Group 2 student's post-test scores increased ($M = 77.6$). Post-test ranged from 60% (9/15) to 93% (14/15) and 80% of the students scored in the 'Moderate' or 'Acceptable Knowledge' category. A small percentage of students (5%, 2 students) scored in the 'Superior Knowledge' category. The remaining 15% of the students scored in the 'Minimal' range and zero students scored in the 'Unacceptably low knowledge' category.

Group 3, on average, displayed an increase in post-test scores as well ($M = 87.1$). Group 3 had zero post-test scores below 70% and scores ranged from 73% (11/15) to 100% (15/15). Almost half (45%, 10 students) scored in the ‘Superior Knowledge’ category, 41% scored in the ‘Acceptable Knowledge’ category, while the remaining 14% scored in the ‘Moderate Knowledge’ category (Figure 4).

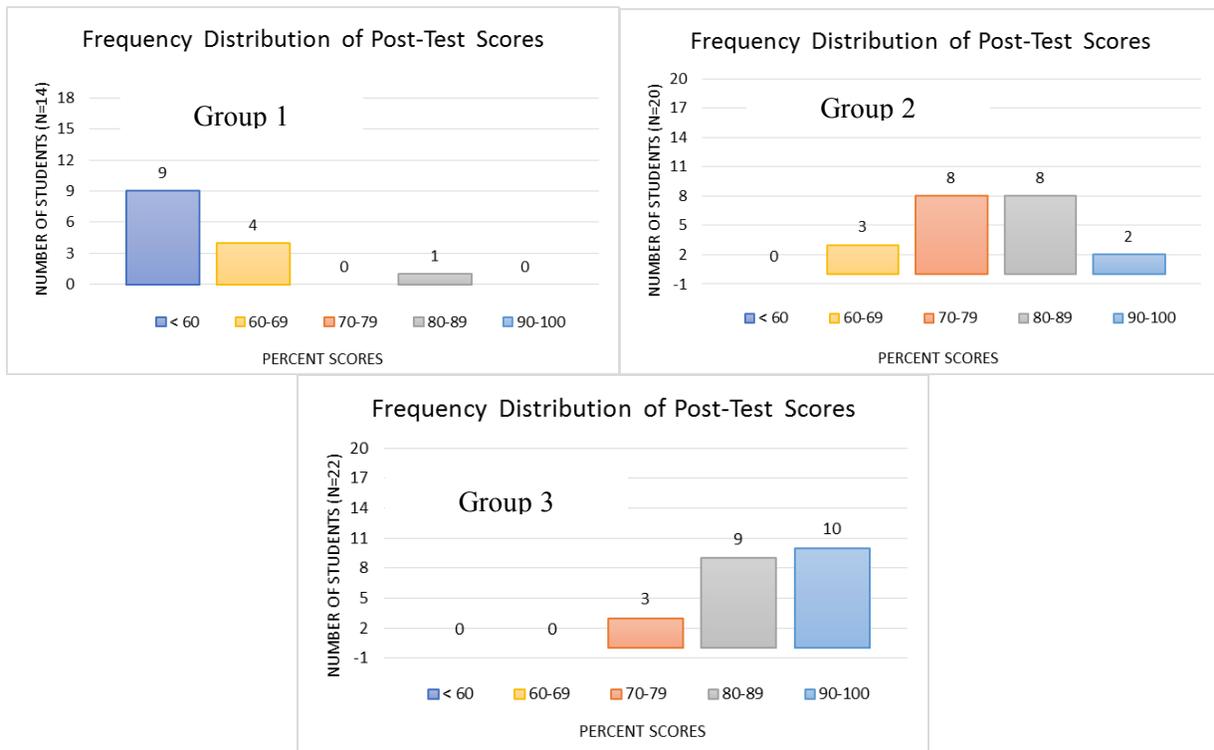


Figure 4. Distribution and frequency of post-test scores for groups 1, 2, & 3

Based on the pre and post-test scores of Group 1, analysis of the means from the Paired Sample T-Test showed there was not a significant difference at the 0.05 alpha level in scores from the pre and post-tests for group 1 ($p = .06$). For groups 2 and 3, paired sample t-test analysis of pre and post-test score means revealed there was a significant difference in scores at the 0.05 alpha level ($p < .001$) (Table 1).

Table 1

Means and Standard Deviations of Pre & Post-Test Scores

	Pre-Test			Post-Test	
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Group 1	14	36.4	14.5	47.6	16.9
Group 2 (Direct Instruction)	21	43.4	16.3	77.6	9.3
Group 3 (Experiential Learning)	22	45.4	17.9	87.1	7.9

The final research question sought to examine if there was a significant increase in

agricultural knowledge test scores between groups based on intervention. The ANOVA output showed there was a significant difference in post-test scores between the three groups at the 0.05 alpha-level ($p < .001$) (Table 2). The ANOVA output also produced the effect size between pre and post-test scores and treatment groups (Table 3). This was done to measure the degree of association between an effect (intervention) and agricultural knowledge. The interaction of pre-test and treatment received accounted for a small portion of the variance (.054), however, for post-test scores, the treatment received accounted for a much larger value (.673) (Table 4).

Categorical variables were dummy coded to achieve a regression output that sought to determine the correlation among post-test scores and teaching intervention. There was a high correlation among post test scores and treatment group ($R = .820$).

Table 2

ANOVA Table for Pre & Post-Test Scores

		Sum of Squares	df	F	Sig.
Pre-Test Scores Treatment Group	Between Groups (Combined)	823.12	2	1.51	.231
	Within Groups	14496.14	53		
	Total	15319.36	55		
Post-Test Scores Treatment Group	Between Groups (Combined)	13832.73	2	54.55	.000
	Within Groups	6718.82	53		
	Total	20551.55	55		

Table 3

Measures of Association Between Pre & Post-Test Scores

	Eta Squared
Pre-Test Scores Treatment Group	.05
Post-Test Scores Treatment Group	.67

A multivariate test was performed to compare test scores among the groups of students (Table 4). There was no significant difference in pre-test scores between the three groups. For the post-test scores, there were significant differences in post-test scores between the three groups at the 0.05 alpha-level. Groups 2 and 3 means were significantly higher than Group 1 ($p < .001$, $p < .001$; respectively). Additionally, post-test mean scores for Group 3 students were also significantly higher than students in Group 2 ($p = .016$).

Table 4

Multiple Comparisons of Test Score Means Based on Treatment Groups

Dependent Variable	Group	Treatment Group	Mean Difference	Sig.
Pre-Test Scores	Control	Lecture Only	-7.89	.174
		Experiential Learning	-10.74	.067
	Lecture Only	Control	7.89	.174
		Experiential Learning	-2.85	.586
	Experiential Learning	Control	10.74	.067
		Lecture Only	2.85	.586
Post-Test Scores	Control	Lecture Only	-30.03	.000
		Experiential Learning	-38.98	.000
	Lecture Only	Control	30.03	.000
		Experiential Learning	-8.95	.016
	Experiential Learning	Control	38.98	.000

Test for significance was performed at the 0.05 alpha-level, bold numbers indicate significance.

Conclusions/Discussion/Recommendations

The groups assessed in this study were private school biology students. As compared to other courses offered in traditional high school settings, biology is closely associated with agriculture and plant and animal production/stewardship. Class sizes were small to medium and private schools in Mississippi offer the flexibility to accommodate additions to current curriculums. One limitation to this study is the three private schools could use different biology curriculums; however, this information was not made known to the PI.

Research question one sought to determine the current level of agricultural knowledge among 10th grade biology students. Level of knowledge was determined by using the pre-test assessment furnished by the *Nourishing the Planet in the 21st Century* curriculum. On average, all three groups displayed an unacceptably low knowledge of agriculture, with Group 1 being the lowest ($M = 36.4$). The researchers found this to be particularly interesting because the 'Advanced Biology' was thought to have the higher score of the three groups. From this, we can conclude at the time of assessment, students in biology had a very low knowledge of agriculture which is similar to many previous studies that indicated agricultural literacy is low in certain populations among today's students (Birkenholz et al., 1994; Riedel, 2006).

Even though all three groups had different scores, a non-significant p value (.231) revealed they were similar in their lack knowledge of agricultural. Frick et al. (1995) and Pense & Leising (2004) studies indicated similar results. The researchers believe this is a result of students not being offered a curriculum that contained agriculturally centered material.

In regard to research question two, the researchers sought to determine if there was an increase in agricultural knowledge among test scores with regard to direct instruction and experiential learning techniques. Group 1 (control group) scores overall increased by 11 percentage points, but was not a significant increase at the 0.05 alpha-level. This could indicate a desire to perform better on the post-test than the pre-test rather than a true increase in agricultural knowledge.

The researchers did find a significant increase in Group 2 ($p < .001$) and Group 3 scores ($p < .001$). The students who received direct instruction, increased their score by approximately 34 percentage points and a higher number of students scored in the top tier of acceptable agricultural knowledge than before the treatment. Three of 21 students were classified as having minimal or low knowledge of agriculture after the teaching intervention as compared to 20 of 21 students scoring in the same categories before intervention.

For the students who received the experiential learning teaching intervention, their scores increased approximately 42 percentage points. Before the intervention, 20 of 22 students scored in the lower tier of agricultural knowledge, whereas after the intervention zero (0) students scored in the same lower categories. By incorporating agriculturally contextualized lessons, whether it be direct instruction or via experiential learning, student scores increased on average by approximately 38 percentage points.

Finally, in regard to research question three, the researchers wanted to investigate if there were significant differences in increases to agricultural knowledge based on treatment received. The ANOVA output revealed there were significant differences among groups in regard to agricultural knowledge ($p < .001$). Groups 2 and 3 showed a significant increase in agricultural knowledge compared to Group 1. Additionally, Group 3 student scores were also significantly higher than that of Group 2. From this, we conclude students who were part of

the experiential learning group had higher scores than just lecture and no treatment. The rendered *R* value of .820 obtained from the regression output indicated a strong correlation of post-test scores based on the dependent variable. The measure of association shows that approximately 67% of the variance in scores is attributed with the teaching method each group received. This findings is substantial. The researchers attributed this increase to the added value experiential learning contributes by providing students deeper understanding and richer experiences (Kolb, 1984).

A recommendation for future research is to continue to assess agricultural knowledge by way of experiential learning. Also, researchers are encouraged to reach populations who are traditionally unlikely to administer such curriculums, such as private schools. More studies should be conducted to assess agricultural knowledge and perceptions (agricultural literacy) and practical ways to implement feasible programs to existing populations. More studies should focus on engaging the general public in meaningful and factual communication regarding agriculture and its impact on society.

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Undergraduate Student Thoughts on Using the Science of Genetic Modification as a Solution to Citrus Greening

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Abstract

Citrus is one of Florida's most prominent commodities, providing 66% of the total United States' value for oranges and 65% for grapefruit. The 124.0 million boxes of citrus produced in 2013-2014 were 59% of the United States' total citrus production and were down 21% from the previous season's production, partly due to citrus greening disease. The government has invested more than \$220 million dollars into finding a solution to citrus greening, with GM science being one of the most promising solutions. However, a majority of American adults believe foods produced using GM science are unsafe for consumption. This study investigated whether the idea of GM science had diffused among Millennial students in a College of Agriculture at a land-grant university and their intent to purchase citrus from a tree developed with GM science. Online surveys collected construct data about the five Rogers' diffusion of innovation model characteristics and intent to purchase from 101 respondents in agricultural courses. Relative Advantage and Compatibility of GM science were rated most favorably, with Observability as the lowest. More than 50% of respondents were likely or extremely likely to consume fruit or juice from GM trees. Compatibility was the only significant predictor of likelihood to consume GM citrus. Undergraduate students studying agricultural and life sciences are likely to consume GM food, if they have not done so already, though not without challenges. A better demonstration of GM science's compatibility, trialability, complexity and observability through formal education is needed to improve GM science adoption by Millennials.

Introduction

In Florida, the agricultural industry remains one of the state's top economic contributors, adding more than \$104 billion to the state's economy and providing more than two million jobs (FDACS, 2013). The industry produces 300 different agricultural commodities from 9 million acres of farm land and 47,500 farms (FDACS, 2013). Citrus is one of the state's most prominent commodities, employing more than 75,000 (Rahmani & Hodges, 2009) and providing 66% of the total United States' value for oranges and 65% of the total United States' value for grapefruit (FDACS, 2013). Florida's 124.0 million boxes of citrus produced in the 2013-2014 season made up 59% of the United States' total citrus production (Hudson, 2015). However, Florida's citrus production was down 21% from 156.2 million boxes produced in the 2012-2013 season (Hudson, 2015).

The drop in Florida's citrus production is due in part to citrus greening disease (also known as Huanglongbing or HLB). "Citrus greening is considered to be one of the most serious citrus diseases in the world" (USDA APHIS, 2014, para. 4). Citrus greening was first found in Florida in 2005 and is now prevalent in citrus groves and residential citrus trees throughout the state (Burrow, Spann, Rogers, & Dewdney, 2014). The bacterial disease is spread by the Asian citrus psyllid and causes both the citrus tree and fruit to produce adverse symptoms such as yellowing and decreased fruit size and quality (Burrow et al., 2014; Danyluk, Spann, Rouseff, Goodrich-Schneider, & Sims, 2011). Mature trees infected with citrus greening become less productive and in some cases stop producing fruit. Young trees infected with the disease commonly die within one to two years (Bransky, Dewdney, & Rogers, 2013). Citrus growers participate in management practices

such as integrated pest management, scouting, and tree removal in an effort to control the spread of the disease, but there is no cure for citrus greening (Brlansky et al., 2013; USDA APHIS, 2014).

From the 2006-2007 citrus season to the 2010-2011 citrus season, it was estimated that Florida lost more than 216 million boxes of citrus, \$4.54 billion in economic output, and 8,257 jobs from citrus greening (Hodges & Spreen, 2012). “Experts say that if a solution isn’t found, Florida’s entire citrus industry could collapse” (Lush, 2014, para. 22).

The science of genetic modification (GM science) has been identified as one of the potential solutions to citrus greening (Korves, 2015; Mahgoub, 2016) and has already been used to save the papaya industry in Hawaii (Gonsalves, Ferriera, Manshardt, Fithc, & Slightom, 2000). Papaya ringspot virus (PRSV) was devastating papaya production on Oahu, and traditional treatments were unable to stop the spread of PRSV. Genetically modified (GM) papaya was found to be a viable solution, and more than half of the papaya grown in Hawaii was GM by 2006 (Lemaux, 2008). The government has invested more than \$220 million dollars into finding a solution to citrus greening (Putnam, 2015), with GM science being the most promising solution to save the industry (Bove, 2012). However, consumers have not typically viewed GM science as favorable (Frewer Scholderer, & Bredahl, 2000), which has made “... consumer acceptance of biotechnology a critical issue for stakeholders in all nations” (Irani, Sinclair, & O’Malley, 2001, p. 7). According to Funk and Rainie (2015), 57% of American adults believe foods produced using GM science are not safe for consumption, yet science has found food produced using GM science to be safe and unrelated to health issues (Nicolia, Manzo, Veronesi, & Rosellini, 2014).

Consumer acceptance of new technology is essential for the success of a product (MacFie, 2007). Understanding consumer perceptions of food produced using GM science provides insight to the potential acceptance and success of citrus produced through GM science. Clough (2011) stated “...knowledge, accurate or not, is what citizens use when assessing public issues involving science and technology” (p. 701). Once an individual has completed formal education, media becomes their main source of information about science and science-related topics (Nisbet et al., 2002). Therefore, it is important that formal education both at the secondary and post-secondary levels educate students about science and public issues involving science and technology, including GM science. In addition, current undergraduate students in Colleges of Agriculture and Life Sciences will be serving as the future leaders of the agricultural industry; therefore their understanding of science as it relates to food production practices is extremely important. Lamm, Lamm, and Strickland (2013) identified changing cultures and increased pressures on the land-grant system as challenges that need to be addressed in the classroom as agricultural educators prepare future leaders. The land-grant mission supports innovative ideas and technological advancements, while translating science and research to the public; however, little is known about how undergraduate students within Colleges of Agriculture and Life Sciences think about and make decisions regarding the use of GM science.

Adults, both young and old, have been found to have similar beliefs about the safety of GM food (Funk & Rainie, 2015). Additionally, Ruth, Gay, Rumble, and Rodriguez (2015) found that college students were generally unsure about the risks and benefits related to GM food. Most of today’s college students are part of the Millennial generation. Those in the Millennial generation were born between 1980 and 2002 (Elmore, 2010; Howe & Strauss, 2007; Payment, 2008; Taylor, & Ketter, 2010) and make up 23% of the United States’ population (American Community Survey, 2014). The Millennial generation has been identified as having more buying power than previous generations (Hais & Winograd, 2011), further necessitating the need to educate this generation about GM science and GM food. Additionally, research has shown that college students form attitudes about issues throughout the course of their collegiate studies (Sears, 1986), thus making them an important population to study (Goodwin, 2013). This study seeks to determine if the idea of GM science has diffused among Millennial students in a College of Agriculture and Life Sciences at a land-grant university and if they would be willing to purchase citrus from a tree developed with GM science. This research directly aligns

with priority two of the American Association for Agricultural Education's National Research Agenda, which calls for research that examines adoption processes and gaps in knowledge that may hinder educational efforts about an innovation (Doerfert, 2011). By further identifying knowledge gaps related to GM science, agricultural educators can enhance educational methods that will assist undergraduate students in making informed decisions about GM science as it relates to the future of agricultural production.

Theoretical Framework

The theoretical framework for this study stems from Rogers' diffusion of innovation theory (2003). Diffusion of innovation theory (Rogers, 2003) has been used extensively in agricultural education research and provides a strong foundation for diffusing an innovation such as GM science (e.g., Bowen, Stephens, Childers, Avery, & Stripling, 2013; Murphrey & Dooley, 2000; Rollins, 1993). According to Rogers, (2003) an innovation is, "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 12). In this study, GM science represents the innovation. Rogers described five characteristics that determine the rate of adoption for an innovation: (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability. Relative advantage is "the degree to which an innovation is perceived as being better than the idea it supersedes" (Rogers, 2003, p. 229). Compatibility pertains to how easily an individual can fit the innovation into his/her life and if the innovation is consistent with his/her values and needs (Rogers, 2003). Complexity describes how easy an innovation can be understood and used. Trialability is how the innovation can be experimented with by adopters and is positively related to rate of adoption. Lastly, observability is defined as "the degree to which the results of an innovation are visible to others" (Rogers 2003, p. 16). Higher rates of adoption are observed when relative advantage, compatibility, trialability, and observability are high and complexity is low.

Weick and Walchi (2002) used the five factors of diffusion to identify the barriers GM food would have to overcome to be successful in the consumer market place. Concerns related to relative advantages were the long-term environmental risks for growing GM food, health risks, and ethical concerns. The researchers concluded that GM science should be compatible with United States consumers due to the culture's ability to embrace technology and science. However, food safety has been a major concern in the United States and could have a negative influence on the compatibility of GM food. Complexity of GM food was determined to be quite high because consumers are concerned with the effects of the products, how they were produced, and the actual science that goes into developing them. Since the current societal benefits of GM food have not directly benefited the United States consumer, trialability was not existent. Enriquez and Goldberg (2000) have suggested that consumers focused more on the risks since benefits cannot be directly seen by consumers, which makes observability difficult to assess. The researchers concluded that the five factors had either a neutral or negative effect on the adoption of GM food. In a similar study, Klerck and Sweeney (2007) predicted the attitudes toward GM food would have to be positive for the innovation to be viewed as having a greater relative advantage compared to other food products. Further research is necessary to understand the adoption of GM science as an innovation, particularly in a context like citrus greening where it may be one of the best possible solutions.

Diffusion of technologies and science is not just important in the consumer sector, but also in educational learning environments. In an educational setting, Murphrey and Dooley (2000) examined the diffusion of distance education technologies among college administration, faculty, and support staff. The research found the rate of diffusion of distance education technologies to be negatively affected due to complexity, limited observability, limited trialability, and limited compatibility. The researchers made the following recommendations to increase diffusion of distance education technologies: implementation of an incentive program to boost relative advantage; increasing compatibility by tying distance education to "existing values, past experiences, and needs of potential adopters" (Murphrey & Dooley, 2000, p. 48); reducing complexity by

focusing on less complicated components of distance education and providing technical expertise for more complicated components; providing the opportunity for the individual to start the diffusion process to boost trialability; and by increasing observability through the recognition successful distance education efforts.

Purpose and Objectives

The purpose of this study was to determine if the idea of GM science has diffused among Millennial students in a College of Agriculture at a land-grant university and if they would be willing to purchase citrus from a tree developed with GM science. The strength of the diffusion will allow educators to identify a need to further enhance educational methods to translate GM science throughout formal education. The following research objectives guided the study:

1. Describe undergraduate students' perceived relative advantage, compatibility, complexity, trialability, and observability of GM science.
2. Describe undergraduate students' likelihood of consuming citrus products made with GM science.
3. Determine if undergraduate students' perceived relative advantage, compatibility, complexity, trialability, and observability of GM science predicts their likelihood to consume citrus products developed from GM science.

Methods

The study's population was undergraduate students enrolled in the College of Agriculture and Life Sciences at the University of Florida. The population was sampled through a convenience sample of two courses offered to undergraduate students in the College of Agriculture and Life Sciences at the University of Florida ($N = 175$). A convenience sample was suitable due to practical restraints, efficiency, and ease of access to students in the College of Agriculture and Life Sciences (McMillan & Schumacher, 2010). However, the use of a convenience sample limits the generalizability of the results (McMillan & Schumacher, 2010).

The instructors generated a list of students' names and email addresses of those enrolled in their course. The questionnaire was administered using Qualtrics, an online survey development tool. The target population had access to the Internet, therefore an online survey instrument was used (Dillman, Smyth, & Christian, 2014). The instructors announced the upcoming survey in their course period prior to the launch of the survey. Each student was given an identification number and emailed a personalized link to the survey. Students had one week to complete the survey, with reminders sent on day six and day seven (Dillman et al., 2014). Extra credit in the course was given for completing the survey. The incentive of extra credit presents limitations to the study as it may have caused students to complete the survey only for the extra credit, paying little attention to the questions or providing much thought to their responses. A total of 123 students responded to the survey, achieving a response rate of 70.3%. Twenty-two of the respondents were removed from the sample due to age restrictions, reducing the number of usable responses to 101.

The survey was part of a larger research study, but for the purposes of this manuscript, six constructs were used for analyses, in addition to demographic questions (age, gender, race, and class rank). All questions and constructs were researcher developed. Prior to data collection, a panel of experts reviewed the final instrument to ensure face and content validity and IRB approval was obtained from the University of Florida. The panel of experts included the Associate Director of Center for Public Issues Education, an assistant professor focused on food production and well published in GM science, and an associate professor with extensive knowledge in survey design.

To measure undergraduates' perceived relative advantage, compatibility, complexity, and trialability of GM science, researchers used a series of Likert-type and semantic differential scales. To measure undergraduate students' perceived *relative advantage*, *compatibility*, and *trialability* of GM science, a five-point Likert scale was used (1 = *Strongly disagree*, 2 = *Disagree*, 3 = *Neither agree nor disagree*, 4 = *Agree*, 5 = *Strongly agree*).

The construct measuring *relative advantage* included eight items with an alpha reliability of .88. The question in the construct asked about the advantages to GM science and included statements such as, "GM science enhances the taste of food" and "GM science increases the amount of food a farmer can grow." An index for *relative advantage* was created by adding the scores of each item in the construct and dividing by eight.

Compatibility was measured by six statements that asked about how GM science aligned with the respondent's beliefs and values. An example of some of the items in this construct include, "Developments in GM science help make society better" and "Overall, GM science does more harm than good." Negatively framed statements were reverse coded before data analysis. The six items were found to be reliable ($\alpha = .88$). An average of the items was taken to create an index for *compatibility*.

The construct measuring undergraduate students' perceived *trialability* of GM science included five items asking respondents about their interaction with or ability to try products made from GM science, such as "Food products that result from plants made with GM science are easy to try" and "The opportunity to try food products that result from plants made with GM science is not available to me." Negatively framed statements were reverse coded before data analysis. The items had an alpha reliability of .58. However, after the removal of one of the statements, reliability increased to .71. The reliability of the construct was determined to be acceptable according to Baruch and Holtom (2008). An average of the remaining four items in the construct was calculated to create an index for *trialability*.

Complexity and *observability* of GM science were measured on five-point semantic differential scales. These questions asked the respondents to indicate how they felt about a statement by marking where they fell between two bipolar adjectives or statements. For both constructs, negative adjectives were assigned a 1 (e.g. "complex" or "invisible") and positive adjectives were assigned a 5 (e.g. "simple" or "visible"). Therefore, scores closer to one represent high complexity or low visibility, while scores close to five represent low complexity or high visibility. Six pairs of adjectives were used to measure *complexity* and had an alpha reliability of .77. The six pairs of adjectives were averaged to create an index. Six pairs of adjectives were used to measure *observability* and had an alpha reliability of .89. These items were averaged to create an index for *observability*.

The last question asked respondents to indicate their likelihood of consuming fruit or juice grown on a genetically modified tree. To measure their likelihood to consume, a five-point Likert scale was used (1 = *Extremely unlikely*, 2 = *Unlikely*, 3 = *Neither likely nor unlikely*, 4 = *Likely* and 5 = *Extremely likely*).

Following the descriptive analysis of each construct (objectives one and two), the respondents' likelihood of consuming GM citrus was recoded into a dichotomous variable for analysis using logistic regression for objective three. Responses of *very unlikely*, *unlikely*, or *neither likely nor unlikely* were given a score of "0" and responses of *likely* or *very likely* were assigned a "1".

Results

Description of respondents

Of the useable responses, 64.4% were female and 32.7% were male (Table 1). The majority of respondents were Caucasian (83.2%), followed by Asian (9.9%), African-American (5%), and American Indian or Alaska

Native (2%). Additionally, 17.8% considered themselves to be Hispanic, Latino, or Chicano. More than half indicated their age ranged between 21-25 years old (63.4%). Forty percent considered themselves to be Republican and 39.6% identified their political beliefs as moderate. When looking at college rank, most of the respondents were Juniors (60.4%), followed by Seniors (36.6%), and then Sophomores (3.0%).

Table 1

Demographics

	<i>n</i>	<i>%</i>
Sex		
Female	65	64.4
Male	33	32.7
Race		
African American	5	5.0
Asian	10	9.9
Caucasian/White (Non-Hispanic)	84	83.2
Native American	2	2.0
Other	7	6.9
Hispanic Ethnicity	18	17.8
Age		
18 - 20	32	31.6
21 - 25	64	63.4
26 - 29	3	3.0
30 - 34	2	2.0
Political Affiliation		
Republican	41	40.6
Democrat	19	18.8
Independent	30	29.7
Other	8	7.9
Political Beliefs		
Very Liberal	2	2.0
Liberal	20	19.8
Moderate	40	39.6
Conservative	30	29.7
Very Conservative	6	5.9
School Rank		
Senior	37	36.6
Junior	61	60.4
Sophomore	3	3.0

Perceived relative advantage, compatibility, complexity, trialability, and observability of GM science

Respondents were asked to indicate their perceptions of the five characteristics of an innovation (Rogers, 2003), related to GM science. An index was created for *relative advantage*, *compatibility*, *complexity*, *trialability*, and *observability* of GM science. The mean and standard deviation for each index are in Table 2. The respondents perceived the relative advantage and compatibility of GM science to be more favorable than the trialability, complexity, and observability of GM science. However, relative advantage was the only characteristic with a score falling more than .50 above or below the mid-point of the scale.

Table 2

Diffusion of Innovation Characteristics (N = 101)

	M	SD
Relative Advantage	3.78	.70
Compatibility	3.47	.76
Trialability	3.20	.73
Complexity	2.71	.68
Observability	2.63	.91

Likelihood of consuming citrus products made with GM science

Table 3 displays the likelihood of respondents' consuming citrus fruit or juice grown from a genetically modified tree. Respondents identified their likelihood on a five point Likert-type scale. Respondents answered favorably to this question with 56.1% indicating they were likely or extremely likely to consume fruit or juice from citrus grown on a genetically modified tree.

Table 3

Likelihood of consuming GM citrus (N = 101)

	Extremely Unlikely %	Unlikely %	Neither Likely nor unlikely %	Likely %	Extremely Likely %
How likely or unlikely are you to consume fruit or juice from citrus grown on a genetically modified tree?	4.1	13.3	26.5	36.7	19.4

Predicting likelihood to consume citrus products developed from GM science

A logistic regression model was run, using the dichotomous variable as the dependent variable, to determine if perceived innovation characteristics were significant predictors of likelihood to consume. Compatibility was found to be a statistically significant predictor of likelihood to consume GM citrus (Table 4). This result indicated that as respondents' perception of GM science being compatible with their beliefs and values increased, the log odds of the respondent being likely or very likely to consume GM citrus increased.

Table 4

Influence of perceived GM science innovation characteristics on likelihood to consume citrus products made with GM science

Index	b	p
Compatibility	1.74	.00**
Relative Advantage	.84	.15
Trialability	.61	.15
Complexity	.45	.33
Observability	-.05	.88

Note. ** $p < .01$. $R^2 = .50$.

Conclusions

Understanding undergraduate students' perceptions of GM science, and likelihood of consuming a product made with GM science, is important to the future success of the technology (MacFie, 2007) as a solution to

diseases such as citrus greening and provides insight into how agricultural educators can develop curriculum that assists this important audience in making informed decisions about GM science. This study used Rogers' (2003) five characteristics of an innovation to gain a deeper insight into the adoption of GM science and how the level of diffusion influenced the likelihood to consume citrus fruit and juice from a GM tree. The relative advantage of GM science was the only characteristic that the respondents viewed positively. Since the relative advantage of GM food has to be positively perceived for adoption (Klerk & Sweeney, 2007), undergraduate students in this study are likely to adopt GM food, if they have not done so already. This is encouraging since Funk and Rainie (2015) found 57% of American adults believe foods produced using GM science are not safe, indicating students that will be the future leaders of agriculture are more accepting of GM science than the general public.

However, the findings indicate there are still more challenges to overcome with this important audience. In fact, the respondents viewed the remaining four characteristics of GM science as neutral. Studies have already concluded that Millennials have been unsure about GM food (Ruth et al., 2015), and this finding further supported that claim. Weick and Walchi (2002) had concluded that trialability and observability of GM products are difficult for consumers to experience with GM products, which is reflected in the neutral characterization of the qualities. However, complexity was found to be neutral in this study, which conflicts with previous literature (Weick & Walchi, 2002). The respondents were students in the College of Agriculture and Life Sciences and may have been exposed to the GM science through their coursework previously. Learning about GM science in a formal setting may have decreased the perceptions of complexity when compared to the general public. Compatibility also was perceived as neutral by the respondents. Similar to observability and trialability, this characteristic may be difficult to experience, which likely led to the neutral responses.

More than half of the respondents reported they were likely or extremely likely to purchase GM citrus fruit or juice in the future. This finding supported prior conclusions in this study that undergraduate students were likely to accept GM products as reflected by their positive perceptions of the relative advantage. This acceptance may stem from their knowledge of GM food or from generational differences in values. Even though relative advantage was the only positive adoption characteristic perceived by the respondents, it was not a predictor of whether they would consume GM citrus. The only predictor was compatibility, which was positively related to consuming GM citrus. The predictive relationship between compatibility and likelihood to consume GM citrus conflicted with prior research. Weick and Walchi (2002) concluded that the characteristics of adoption had either neutral or negative effects on the acceptance of GM food.

In this case, compatibility measured how closely GM science aligned with the respondents' beliefs and values. Since the respondents attended a large research institution and were enrolled in a College of Agriculture and Life Sciences, they may have favorably viewed research and science in general. Their views on their compatibility with GM science likely differ from the general public and can explain this predictive relationship. Trialability, complexity, and observability were likely not predictors simply because they are difficult characteristics for students to comprehend in regards to GM science. However, the fact that relative advantage was not a predictor of adoption when it was the only positive characteristic does have implications. Even though the students perceived scientific, tangible qualities of GM science to be positive, this knowledge was not a predictor for adoption. Undergraduate students' values and beliefs were more important to the decision making process than the relative advantage of the science when examining their adoption of GM citrus.

Implications and Recommendations

Consumer acceptance of GM science will be essential for the future success of the citrus industry if the technology is used to combat citrus greening disease. Even though more than half of the respondents reported

they were likely or extremely likely to consume GM citrus, the citrus industry and higher education will still need to work on ways to facilitate the diffusion of GM science if they want to encourage the consumption of citrus products produced from GM trees. A large effort should be put toward further educating College of Agriculture and Life Sciences undergraduates about GM science since they will have large purchasing power in the future (Hais & Winogard, 2011) and will be serving as leaders within the agricultural industry (Lamm et al., 2013).

Compatibility of GM science with beliefs and values will be important to address since compatibility was the only predictive characteristic of GM citrus adoption. Agricultural educators at higher institutions can help to increase perceptions of compatibility through a variety of outlets. When covering GM science in courses, educators should seek to connect students' values, experiences, and needs with the science (Murphrey & Dooley, 2000). Various educational methods could be used to achieve this, such as discussion about GM science, how it is conducted, and what people think about it. Activities that could be used in the classroom to get students to engage in deeper reflection and discussion to activate values and needs could include think-pair-share activities or an assignment where students are asked to reflect on their values, experiences, and needs related to GM science and then asked to construct a review of popular and scientific literature to identify how the media and science aligns or misaligns with their thoughts.

Additionally, agricultural education programs can develop an agriculturally based issues class that focuses on controversial industry topics. This course could be used to provide students with a more holistic understanding of topics in agriculture, including GM science. The coursework could focus on the non-science side of the issues, and allow students the opportunity to see the effect of GM science on society as a whole. If the course were offered to students outside of the agricultural education program, perceptions of compatibility may increase throughout the agricultural college.

Another way to increase compatibility would be to partner with the Cooperative Extension Service to host a forum-style event to allow students to interact with scientists, farmers, and consumers to learn more about GM science. Giving students the opportunity to express their own opinions would help to make them feel heard and allow agricultural educators, extension professionals, and communicators to address their concerns. Focusing on the values and beliefs students associated with GM science would help facilitate the adoption of GM citrus in the future.

Even though relative advantage, complexity, trialability, and observability were not significant predictors of consumption of GM citrus, they are still important characteristics in Rogers' (2003) diffusion of innovations. The relative advantage and complexity of GM science can be addressed through formal education classes. In classes, educators should make an effort to reduce the complexity of GM science by initially focusing on simple components of the science (Murphrey & Dooley, 2000). For example, starting with a discussion of the GM foods currently available to consumers (corn, soybeans, yellow squash, papaya, alfalfa, sugar beets, canola, potatoes, artichokes, cotton, and salmon) can spark interest and decrease cognitive dissonance. It is common for individuals to falsely believe that products such as seedless watermelon and other fruits and vegetables are genetically modified through transgenic processes. By starting with an initial discovery approach, students become interested and start asking questions. The technical expertise of GM science may be appropriate for students required or motivated to take an advanced genetics course, but for students not in those classes, reducing complexity by starting with the introduction of the topic is important. Introductory agricultural or science classes should integrate content about GM science and GM food to expose undergraduate students to the topic early in their academic careers.

Trialability and observability may be difficult for consumers to identify with GM food, but there are plenty of opportunities at universities for extension professionals and agricultural educators to promote these

characteristics. Agricultural educators discussing GM science or GM food in their courses should look for experiential learning opportunities to accompany their lessons to help encourage the diffusion of these topics. For example, agricultural educators may be able to allow students to try a GM food or experiment with GM science in a laboratory setting.

Observability of GM food or GM science also could be increased by having students identify food products in a grocery store that are genetically modified or by taking a field trip to an on-campus laboratory where GM science could be observed. Tasting panels and educational booths can also be present at campus and community events as well as grocery stores to educate students on what foods are and are not developed by GM science. At campus dining halls, informational posters and signs can be included to help students understand which of the foods they are eating have used GM science and why. Similar to the recommendation for compatibility, a forum could be used to help students interact with farmers, residents of developing nations, or consumers to see how using GM food has benefited them and increase perceptions of relative advantage.

Accompanying the results and conclusions of this study are limitations that should be considered. The convenience sample provided insight into the adoption of GM citrus by College of Agriculture and Life Sciences undergraduate students at the University of Florida, but could not be generalized. To strengthen the findings, a simple random sample from a population of university students is needed. A replication of this survey with the general public also would add to the body of literature. There may be differences between the general public and undergraduate students, which would lead to alternate recommendations. Another limitation associated with this study was that it measured intent to consume GM citrus, which can be different than actual behavior. To gain a greater understanding of the adoption of GM citrus, an observability study will be necessary. Since GM citrus does not yet exist, one way to observe this behavior would be to offer subjects orange juice under the false pretense that they are GM, followed by a debriefing of the subjects after the research.

An educational program also could be tested to determine its effects on diffusion. A curriculum could be developed to teach students about citrus greening and GM science. A pretest-posttest design used to determine how the curriculum influenced perceptions of relative advantage, compatibility, complexity, trialability, and observability of GM science as well as likelihood to consume citrus products developed from GM science. Future research also should test message frames to determine how to best promote the adoption of GM citrus. Based on the results from this study, frames should focus on promoting compatibility with GM science. These research recommendations could be used to study other potential GM foods, which have yet to reach the market.

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Communicating about Contentious Issues: Florida Extension Agents' Role

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Abstract

This study was designed to explore the environment surrounding Florida Extension agents as they communicate about contentious issues with clientele. A total of 125 Florida Extension agents responded to the online survey, and descriptive statistics were reported to satisfy this study's objectives. Extension agents believed communicating about contentious issues was essential and meaningful, but they reported availability of false or misleading information and complexity of issues as the most challenging obstacles when communicating about contentious issues. One-on-one in person, workshops, phone calls, and group meetings were identified as the most effective methods of communicating about contentious issues. Additional training and familiarization with current contentious issues was recommended. Communication improvements between Extension agents and universities could serve to increase the informational process. Future research should examine the current contentious issues agents are being exposed to, methods being used to facilitate contentious issue conversations, the affect of contentious issues on Extension agents' job satisfaction, and the factors hindering Extension agents as they address contentious issues.

Introduction

State Extension agents have bridged the gap between the Land-Grant university systems and the public for the last century (Warner, Hinrichs, Schneyer, & Joyce, 1998). Extension agents serve to provide invaluable knowledge to the public (Benge, Harder, & Carter, 2011) through agriculture, family and consumer sciences, 4-H youth development, and community development (Conglose, 2000). Extension agents work with Land-Grant universities to help develop research agendas and serve the public by "enhancing the well-being of individuals, families, and communities" (Warner et al., 1998, p. 1) through non-formal education. The role of extension agents has shifted as the needs of the public have become more complex. Extension agents are finding themselves more engaged in community problem-solving roles, allowing them to use the knowledge obtained in policy and program design (Warner et al., 1998).

Technology has changed the way the world communicates (Bailey, Hill, & Arnold, 2014). Agents have taken advantage of technology and used distance-based learning and online resources to reach larger audiences (Rodewald, 2001). Although, Franz, Piercy, Donaldson, Westbrook, and Richard (2010) found Extension agents believed that farmers preferred information via farm visits, one-on-one, demonstrations, field days, and on-farm tests, with order indicating the most preferred. Telg, Irani, Hurst, and Kistler (2007a) found that Florida Extension agents' most preferred communication method with clientele was word of mouth when providing information. In less than optimal situations, such as times of crisis, Extension agents favored personal communication. Telg, Irani, Muegge, Kistler, and Place (2007b) found the most effective communication channels for Extension agents in crisis' situations were face-to-face communication, telephone calls, on-site visits, and cell phones when communicating with clientele.

Some studies have found that high-technology approaches tend to alienate older clientele (Radhakrishna, Franklin, & Kessler, 2003; Rodewald, 2001). Rodewald (2001) found Extension agents' clientele preferred printed informational sources, even as technology continued to advance. Radhakrishna et al. (2003) also found

clientele preferred newsletters, publications, and field tours when receiving information. Licht and Martin (2007) found that clientele preferred personal consultations for the reliable, timely, and local information to their problems. Farmers in that study admitted they received the bulk of their information from mass media but still relied on interpersonal communication for more reliable information (Licht & Marton, 2007). Franz et al. (2010) also found farmers preferred hands-on, demonstrations, farm visits, field days, discussions, and one-on-one methods of receiving information, with order indicating the most preferred method. Before Extension agents can provide clientele with information, they must locate the information to be dispersed.

The way Extension agents search for information to serve their clientele and programming efforts has changed over the last 20 years. In order to serve clientele and develop new programs, Extension agents have been required to use multiple information sources and mediums (Conglose, 2000; Radhakrishna & Thomson, 1996). Rodewald (2001) found Extension agents preferred printed informational sources and online informational sources when seeking out information for clientele. Bailey et al. (2014) revealed that Extension agents were primarily using the Internet as a source of information but associated less credibility with this source. In contrast, Extension publications, research journals, and university specialists were viewed as the most credible sources by Extension agents when seeking out information for clientele. Trustworthiness and quality were the top factors when assessing informational sources but were also considered the leading challenge (Bailey et al., 2014; Brain, Irani, Hodges, & Fuhrman, 2009). Additionally, the daunting task of cyphering through all these mediums, while monitoring source credibility, has created new barriers for Extension agents (Bailey et al., 2014). In the search to serve their clientele and programming efforts, technology and lack of time have become a barrier when searching for information (Bailey et al., 2014).

In addition to the mediums and techniques used, communicators are assessed on character attributes. Parsons and Urbanski's (2012) study established several traits reflective of effective communicators: truthful, conciseness, and clarity. Extension agents are required to build mutual respect, confidence, and trust in order to be effective in their role (Warner et al., 1998). Trust serves as a key element in any social interaction (Slovic, 1993).

Extension agents are becoming progressively exposed to controversial public issues; though, their involvement is not necessarily by choice. Extension agents are often sought out by the public and university officials to facilitate dialogue and educate the public as controversial issues arise (Patton & Blaine, 2001; Welch & Braunworth, 2010). The very nature of these issues carries risk and often results in explosive and emotional decisions being made by those involved (Goodwin, 1993; Welch & Braunworth, 2010). Extension agents have developed a role in mediating controversial issues through its "interdisciplinary nature and credibility within communities" (Welch & Braunworth, 2010, p. 2). Agents have *moderated* these types of conversations in the past, but they have also utilized the *contrasting viewpoints* method. Both methods have their advantages in deescalating situations.

Extension agents' traditional role has served to moderate the conversation surrounding contentious issues (Schumaker & Lloyd, 1997). In the course of accepting Extension agents' moderator role, bias and credibility have been identified as key factors considered by clientele (Welch & Braunworth, 2010). When educating the public, Extension agents' previous research and clientele relationships imply a degree of bias to the onlooker. However, these relationships and Extension agents' research portfolio also reinforce the Extension agents' credibility (Welch & Braunworth, 2010). Extension agents prefer a proactive approach when contentious issues arise but reactive responses may be unavoidable (Schumaker & Lloyd, 1997). The moderator's role becomes increasingly complex because different views and solutions to the problem exist between parties (Welch & Braunworth, 2010). The educational meetings implemented to resolve issues sometimes follow tense situations within the communities, which allows for comments to be made, questions to be answered, and concerns to be addressed (Schumaker & Lloyd, 1997). Nonetheless, in regulating the educational meeting format, ensuring

adequate resources, removing bias, and establishing their role in the meeting, Extension agents are often able to successfully serve their clientele during tense situations (Shumaker & Lloyd, 1997).

Extension agents have also utilized another effective method, allowing them to aid clientele while still distancing their involvement from the controversy (Goodwin, 1993). This method, referred to as the contrasting viewpoints method, allows Extension agents to provide all the empirical evidence concerning the issue to clientele, addressing value judgments and belief structures. The contrasting viewpoint method is designed to encourage clientele to consider all perspectives of the issue, rather than encouraging them to think a particular way (Goodwin, 1993). This method enables Extension agents to deescalate the situation and allows clientele to leave the educational activity more informed; this method is not designed to arrive at a decision. Goodwin (1993) found one hour of an educational activity helped moderate the attitude of a well-educated group regarding an emotional, controversial issue. While this appeared to be an effective method in addressing contentious issues, when incorporated by opponents inversely, this method is vulnerable to being abused. The contrasting viewpoints method still fosters an educational tool that allows all information to be accurately presented when addressing contentious issues (Goodwin, 1993).

Many obstacles impede Extension agents in the pursuit of facilitating controversial issue conversations. Extension agents' roles are becoming more complex as they are sought out to address contentious issues for clientele, which encompass a tense and emotional situation (Goodwin, 1993; Patton & Blaine, 2001; Warner et al., 1998). Furthermore, the occurrence of these controversial issues appears to be on the rise (Patton & Blaine, 2001). In an effort to serve clientele and find solutions, Extension agents have run into obstacles as they sift through copious amounts of resources to locate credible information (Bailey et al. 2014). Extension agents deal with many challenges in their line of work (e. g., county, state and national issues, colleagues, lack of guidance, etc.), as well as balancing their family, and they have become stressed and burned out. As a result, many Extension systems have been experiencing increased employee turnover (Enslie, 2005). In accordance with the national research agenda second priority area: New technologies, practices and products adoption decisions (Doerfert, 2011), this study sought to explore how Florida Extension agents communicate about contentious issues with their clientele, while also assessing attitudes and challenges that arise when communicating about contentious issues. As new challenges arise for Extension agents, such as the prevalence of contentious public issues, the industry will need research-based information to guide the conversation.

Conceptual Framework

Human communication revolves around verbal and nonverbal communication between two or more people (Stone, Singletary, & Richmond, 1999). In the course of studying communication between people, research has established the dynamic, constantly evolving, process of communicating, which differs from each person to the next. The human communication process focuses on three primary types of communication: expressive, accidental, and rhetorical (Stone et al., 1999).

Expressive communication involves messaging encompassing the emotions and the well being or feelings of another person/object (Stone et al., 1999). Expressive communication does not necessarily imply intention or forethought, but is thought to reveal peoples' true feelings. *Accidental* communication usually occurs as a result of unconscious behaviors and often includes poor planning. This type of communication involves unintentional messages being received via verbal or nonverbal communication. In contrast, *rhetorical* communication is goal oriented and intentional (Stone et al., 1999). Rhetorical communication is designed to create a specific meaning in the mind of the receiver—a persuasive method of communicating. Like expressive and accidental communication, rhetorical communication has been embedded in the American culture (Stone et al., 1999).

Since its inception in the 1900's, the Cooperative Extension Service has always served the role of educating others (Conglose, 2000). The foundational responsibility of Extension agents has primarily utilized a rhetorical communication approach. Rhetorical communication is used by Extension agents to spread useful and practical information to clientele, with the idea that the knowledge will be applied in their clienteles' lives (Conglose, 2000). When addressing contentious issues, using methods like contrasting viewpoints, Extension agents attempt to persuade clientele to acknowledge all perspectives by presenting a variety of information (Goodwin, 1993).

As controversial issues arise, emotional discussions often occur and result in expressive dialogues (Goodwin, 1993). These types of expressive communication characteristics usually escalate as blame is shifted to each party involved, and emotions quickly intensify (Welch & Braunworth, 2010). However, Goodwin (1993) found that an educational program using the traditional rhetorical communication method was able to moderate the emotions during a controversial issue amongst clientele.

With tempers reaching extreme levels during controversial discussions, the role of the Extension agent must be precise as they help clientele understand the issues (Schumaker & Lloyd, 1997). Agents' problem-solving roles require them to serve an intermediate position between universities and the public, ensuring the correct information is being disseminated: Accidental communication can result in disaster (Warner et al., 1998). Entering these controversial discussions requires detailed planning to control conversations and help reduce the tension. While poor planning and communication can lead to chaos, unintentional efforts can certainly intensify the problem (Schumaker & Lloyd, 1997). The human communication process reinforces the need for Extension agents to utilize rhetorical communication, control expressive communication, and prevent accidental communication when addressing contentious issues. When situations go wrong, how these problems are addressed can mean the difference between disaster prevention and trust building, and a crisis developing (Telg & Irani, 2012).

Purpose

This study sought to explore how Florida Extension agents communicate about contentious issues with their clientele, while also assessing agents' attitudes, and challenges that arise when communicating about these issues. This study was guided by the following research objectives:

RO1: Determine the attitude of Florida Extension agents toward communicating about contentious issues to clientele.

RO2: Identify the challenges Florida Extension agents ensue when communicating about contentious issues to clientele.

RO3: Determine the most effective methods for Florida Extension agents to communicate about contentious issues to clientele.

Methodology

Florida Extension agents ($N = 350$) were selected as the population for the study. Comprehensive Internet access and the smaller population created conditions allowing researchers to conduct a census via an online survey. The inquiries for this survey comprised a portion of a larger study created to gauge the needs of Florida Extension personnel regarding agricultural and natural resources policies and controversial issues. The researchers conducted a series of interviews with key informants in November, 2013 to inform survey development. The interviews provided information regarding current conditions surrounding contentious issues

and were used to formulate inquiries for this study. Preliminary interviews encompassed Extension personnel holding various position levels and with a variety of subject-matter specialties.

Researcher-developed questions included topics to assess attitudes, challenges, and methods used to communicate with clientele about contentious issues. Respondent attitudes toward communicating about contentious issues were measured using a five-point bi-polar semantic differential scale with six items. The construct was reversed coded so positive adjectives were assigned a five and negative adjectives were assigned a one. Respondents were able to indicate what challenges they faced when communicating about contentious issues via an 11-item check all that apply question with the option to utilize a write in “other” category. The effectiveness of different communication methods was evaluated with a five-item Likert-type scale where 1 = *Very Ineffective*, 2 = *Ineffective*, 3 = *Neither Effective nor Ineffective*, 4 = *Effective*, and 5 = *Very Effective*. Demographic questions including race, sex, age, years with Extension, and agent type were also included at the end of the survey.

A panel of experts reviewed the survey questions to confirm face and content validity. Expert members of this panel included the Associate Director of the [Center], the Dean of Extension from [University], and an assistant professor also from [University]. All panel members possessed extensive survey construction and content knowledge. The census technique utilized for the survey allowed the study to mitigate coverage and sampling errors often associated with such research (Dillman, Smyth, & Christian, 2009).

The tailored design method by Dillman et al. (2009) was utilized to construct the survey for this study. Five days prior to the launch of the study a pre-notice letter was emailed from [University] Dean of Extension to all Extension agents within the state. Researchers sent four email reminders following the first contact in mid-June. The first and second reminders were emailed seven and 16 days after the initial contact, respectively. Due to a holiday, a third reminder occurred 12 days following the second with a final notification sent eight days after the third. Closure of the survey occurred 24 hours following the last notice. An online survey company maintained the email originating the first two reminder notifications yet the resulting response rate was not acceptable. The third and fourth reminders utilized a mail-merge approach from university staff email to ensure that notifications did not transfer to receivers’ junk mail. One notable incident occurred following the second reminder when an Extension staff member sent a non-official notice to personnel on that listserv. As no survey links were included in the reminder, the response rate did not increase. A final response rate of 35.7% resulted, with 125 Florida Extension agents responding to at least 50% of the survey questions. Table 1 shows respondent demographics.

The subject matter may have contributed to the response rate as some prospective participants indicated they felt the survey was not applicable to them. Time of year may have also influenced the response rate as the primary survey period occurred in June when many Extension agents may have been away from work for conference or vacation. Furthermore, the utilization of online surveys typically results in lower response rates compared to paper-based surveys (Monroe & Adams, 2012; Nulty, 2008). Nulty (2008), in a study comparing online to paper based surveys, found that online surveys had an average of 33% response rate. While non-response can threaten external validity, this bias was accounted for through comparing the population to known demographics of years of Extension service ($\chi^2 = 3.648, p = .60$) and programmatic areas ($\chi^2 = 6.132, p = .19$) (Miller & Smith, 1983). Population data for the selected demographics matched the respondent populace. Six agent types were utilized to group the respondents: Agriculture (AG); Natural Resource (NR); 4-H, Family Consumer Science (FCS); Horticulture (HORT); Sea-Grant (SEA); and Agents of Unspecified Type (UN).

The data were analyzed using SPSS ® 22 statistical software. Descriptive analyses were calculated to determine [State] Extension agents’ attitudes toward communicating about contentious issues to clientele. Descriptive analyses were also conducted to determine challenges Florida Extensions agents faced when communicating about contentious issues to clientele and the effectiveness of communication methods

Table 1

Respondent Demographics (N = 125)

Characteristic	<i>n</i>	%
<i>Sex</i>		
Female	50	42.4
Male	68	57.6
<i>Age</i>		
20-29	12	10.0
30-39	22	18.3
40-49	19	15.8
50-59	48	40.0
60 -69	19	15.8
<i>Programmatic Area</i>		
Agriculture	37	29.6
Natural Resource	5	4.0
4- H Youth Development	15	12.0
Family Consumer Sciences	16	12.8
Horticulture	39	31.2
Sea-Grant	6	4.8
Unspecified	7	5.6
<i>Years in Extension</i>		
1-5	33	27.7
6-10	22	18.5
11-15	19	16.0
16-20	17	14.3
21-25	9	7.6
26 +	19	16.0

Results

RO1: Determine the Attitude of Florida Extension Agents Toward Communicating About Contentious Issues to Clientele.

Respondents were asked to indicate their attitude when communicating about contentious agriculture and natural resources issues with clientele (Table 2), where high values indicated positive attitudes and low values indicated negative attitudes. Overall, respondents believed that communicating about contentious agriculture and natural resources issues was *important* ($M = 4.52$, $SD = .73$), *essential* ($M = 4.30$, $SD = .85$), and *meaningful* ($M = 4.21$, $SD = .72$). In contrast, when communicating about contentious issues, respondents felt it was *difficult* ($M = 2.66$, $SD = 1.03$) and slightly encouraging ($M = 3.73$, $SD = 1.00$).

Table 2

Attitudes when communicating about contentious issues

Statement	N	M	SD
Unimportant : Important	120	4.52	0.73
Optional : Essential	120	4.30	0.85
Meaningless : Meaningful	120	4.21	0.72
Discouraged : Encouraged	120	3.73	1.00
Difficult : Easy	120	2.66	1.03

Note. Responses based on a semantic differential scale from 1 = *Difficult* to 5 = *Easy*

RO2: Identify the Challenges Florida Extension Agents Ensur When Communicating About Contentious Issues to Clientele.

The challenges respondents faced when communicating about contentious issues to clientele were also examined (Table 3). Respondents felt that both *availability of false or misleading information* ($n = 104$, 83.2%) and *complexity of issues* ($n = 104$, 83.2%) were the most challenging obstacles when communicating about contentious issues. Over half of respondents ($n = 74$, 59.2%) felt *political agendas* was another challenge when communicating about contentious issues. *Language barriers* ($n = 25$, 20%) and *lack of clientele trust* ($n = 29$, 23.2%) were the least perceived challenges when communicating about contentious issues with clientele.

Table 3

Challenges faced when communicating about contentious issues (N = 125)

Challenge	f	%
Availability of false or misleading	104	83.2
Complexity of issues	104	83.2
Political agendas	74	59.2
Translating issues into lay terms	59	47.2
Timeliness of receipt of information	56	44.8
Being non-biased	55	44.0
Cultural differences	53	42.4
Getting and keeping attention	45	36.0
Lack of clientele trust	29	23.2
Language barriers	25	20.0
Other challenges	7	5.6

RO3: Determine the Most Effective Methods for Florida Extension Agents to Communicate About Contentious Issues to Clientele.

Respondents were asked to indicate the level of effectiveness of several communication methods when communicating about contentious issues with clientele (Table 4). Respondents indicated *one-on-one in person* (98.4%), *workshops* (96.0%), and *phone calls* (96.0%) were the most effective communication methods when

communicating about contentious issues with clientele. *Websites* (59.2%), *newsletters* (54.4%), and *blogs* (32.8%) were found to be the least effective of the communication methods assessed in this study.

Table 4

Effectiveness of communication methods

Method	Very Ineffective/ <u>Ineffective</u> %	Neither Effective nor <u>Ineffective</u> %	Effective/ <u>Very</u> <u>Effective</u> %
One-on-One in person	0.8	0.8	98.4
Workshops	0.8	3.2	96.0
Phone call	1.6	1.6	96.0
Group meetings	0.8	4.8	94.4
Email	0.8	10.4	88.8
Website	4.0	35.2	59.2
Newsletter	10.4	32.8	54.4
Blog	15.2	40.8	32.8

Note. N = 125

Conclusions and Implications

This study examined Florida Extension agents' attitude toward communicating about contentious issues to clientele. Respondents felt communicating about contentious issues were important, essential, and meaningful. These findings are consistent with the role of Extension agents as they serve to enhance the well being of individuals, families, and communities (Warner et al., 1998), emphasizing that contentious issues are important and meaningful when it affects their clientele's well being, which are the people they have built relationships with. Contentious issues embody expressive communication characteristics as these conversations often evoke many emotions and individual's true feelings are exposed (Stone et al., 1999; Welch & Braunworth, 2010). Extension agents will continue to play a role in facilitating controversial conversations and must utilize rhetorical communication methods while controlling the expressive communication that occurs; educational rhetorical communication methods are often successful in facilitating tense conversations (Shumaker & Lloyd, 1997).

However, respondents also felt communicating about contentious issues was difficult and only slightly encouraging. The nature of contentious issues encompasses' an unpleasant environment, and Extensions agents' involvement is not necessarily by choice (Patton & Blaine, 2001; Welch & Braunworth, 2010). The findings in this study reiterate the challenges that exist when addressing contentious issues, and the explosive nature of these conversations can cause agents to lose enthusiasm to facilitate them. Challenges like these can result in stress and burnout (Benge et al., 2011; Ensle, 2005), which might be a contributing factor to the increased turnover Extension systems are experiencing.

Respondents in this study reported availability of false or misleading information and the complexity of issues as the most challenging obstacles faced when communicating about contentious issues. These findings amplify the difficult tasks Extension agents are facing as they vigorously search for trustworthy and quality information to provide their clientele (Bailey et al., 2014). The complexities of these issues and difficulty in locating reliable information stresses the need to improve informational practices and to continue research to aid Extension agents (Bailey et al., 2014; Brain et al., 2009).

Political agendas were also found to be a challenge respondents experienced when communicating about contentious issues. This finding was consistent with a study conducted by Brain et al. (2009) in which Florida Extension agents felt that political agendas were a barrier when communicating about agriculture and natural resources. Extension agents believed the government had a lack of support and interest in agriculture and natural resources, and predetermined political agendas did not support agriculture and natural resources. While the results in this study did not specifically identify the challenges Extension agents incurred from my political agendas, these findings suggest that political agendas supersede the issues Florida Extension agents are addressing—a barrier that creates additional obstacles for agents.

When determining which communication methods were most effective when communicating about contentious issues to clientele, respondents deemed one-on-one in person, workshops, and phone calls most effective. Extension agents' in this study found non-electronic methods of communication more effective than electronic methods (i.e., websites, newsletters, and blogs). Several other studies have found Extension agents favored personal communication methods when communicating with clientele (i.e., word of mouth, telephone, farm visits, one-on-one, demonstrations, field days, and on-farm tests; Franz et al., 2010; Telg et al., 2007a; Telg et al., 2007b).

While these studies did not specifically examine Extension agents' preferences regarding contentious issues, the general role of Extension agents is to enhance the lives of their clientele and communities (Warner et al., 1998), suggesting that Extension agents help to make things better or aid when problems arise. It is also worth mentioning that communication preferences of Extension agents, whether reference was made to contentious issues or not, still favored similar personal communication methods in all situations. Additionally, several studies found Extension agents' clientele preferred personal communication methods that matched the methods Extension agents believed were more effective and preferred (i.e., newsletters, publications, field tours, personal consultation, demonstrations, one-on-one methods, and farm visits). This confirms that Extension agents are meeting the needs of their clientele and recognizing the communication methods that work best. It should be mentioned that the results in this study are self reported by Extension agents and are not reflective of what clientele feel are the most effective communication methods.

Recommendations

Extension agents increased exposure to contentious issues indicates that their role in facilitating these conversations will continue. Extension agents' commitment to serve their clientele suggests that they are willing to serve in this role but contentious issues are challenging for agents. The time commitment, accessibility to reliable and trustworthy information, and the explosive and emotional nature of contentious issues are a few of the challenges incurred by agents. Current training for Extension agents may include dealing with contentious issue conversations, but the findings in this study indicate that Extension agents are still experiencing difficulties as they address contentious issues. Agents will be required to encompass a variety of knowledge and competencies to execute their role (Benge et al., 2011; Goodwin, 1993). All agents need to be adequately trained to deal with contentious issues.

Additional training could further help agents understand how to facilitate controversial conversations, deciding whether they should moderate or use a contrasting viewpoints method. No matter what method is used, training should include how to deescalate tense situations, considering how to deal with different temperaments, groups sizes, relationships with the parties involved, and knowledge levels. Training should also focus on ensuring Extension agents are familiar with contentious issue topics. Familiarity with topics will help build rapport and trust with clientele, which will allow Extension agents to better facilitate contentious issue conversations.

However, Extension agents' familiarity with issues can be improved by making changes to the informational systems they use to obtain material.

Extension agents' jobs are already stressful and busy, but trying to find reliable and trustworthy information should not be a barrier transferred to Extension agents. Extension agents aid the universities by assuming their roles, so universities should make sure they are helping Extension agents do their job. Current informational sources being provided appears to be inadequate and changes need to be made. Current informational methods need to be evaluated to determine which should remain. There needs to be an open dialogue between Extension agents and universities to address improvements needed to disseminate reliable information about contentious issues.

Extension agents favored in-person contact with clientele, as do the clientele. Technology may allow Extension agents to communicate with large amounts of clientele by faster means, but that does not mean traditional methods of communicating with clientele should be abandoned. These findings suggest that Extension agents would have to travel frequently to interact with their clientele in-person, and if limited personnel is a factor, then Extension administration may need to consider the costs and benefits of including new communication methods as a part of training to reach clientele versus providing more personnel to reach clientele in person. The quality of interactions should not suffer to accommodate quantity of interactions.

However, Extension services might explore how to incorporate more in-person interactions with clientele, with consideration to hosting more events where clientele travel to meet with agents. These efforts would efficiently utilize Extension agents time and allow them to reach more clientele through face-to-face methods.

Future research should examine what contentious issues Extension agents are currently dealing with and to examine the difficulties associated with facilitating each of them. Researchers should also examine how Extension agents are facilitating each contentious issue and which methods work best. Future research should assess what training Extension agents receive to address contentious issues, how facilitating contentious issues affects agents' job satisfaction, and examine how facilitating these conversations impacts Extension agent turnover. Researchers should explore exactly how political agendas interfere with facilitating contentious issues, and the individuals responsible for pursuing those agendas. Additionally, researchers should determine what external factors hinder agents' when addressing contentious issues. Researchers should also examine the actual methods Extension agents are using to communicate contentious issues to determine which methods are more effective. Contentious issues will continue to exist and place strain on those facilitating them. Future research should continue to document methods being used to facilitate contentious issues and share those findings with others to help improve future efforts.

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Undergraduate Students' Knowledge of International Agricultural Issues by Academic Standing

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Abstract

Future agricultural professionals and scientist are demanded to have broader perspectives and apply their technical knowledge to keep pace with global trends. The purpose of this study was to assess and compare United States (U.S.) and Latin American (L.A.) students' knowledge of international agricultural issues. A modified version of the International Agricultural Awareness and Understanding instrument by Wingenbach et al. (2003) and Hurst (2013) was used. Findings in this study were similar to previous studies. There is a lack of knowledge regarding international agricultural issues among undergraduate students. Despite an overall increase in students' scores by their academic standing, from freshmen to seniors, only 3.5% of the entire population obtained a passing score. Findings in the ANOVA suggest scores from freshmen and sophomores are significantly different than the scores by juniors and seniors. Overall, the correct knowledge of international agricultural issues of Zamorano University (EAP) students was significantly different than the obtained scores by Texas Tech University (TTU) students. It is recommended to explore actions that may provide students with a global perceptive and identify mechanisms that may reinforce students' knowledge of agriculture in an international context.

Introduction

Trends in globalization along with global issues such as food insecurity, sustainability, and socio-political stability have intertwined, becoming solutions and problems at the same time (Whigham & Acker, 2003). Agriculture may be considered one of the biggest contributors to these challenges, yet agriculturalists can play an important role in the development of agricultural solutions to problems worldwide, and contribute significantly to the improvement of global food security and environmental sustainability (Acker, 1999; McIntyre, Herren, Wakhungu, & Watson, 2009). The National Research Agenda of the American Association for Agricultural Education (AAAE) indicates that in order to meet global food, fiber, and energy needs, it is essential to prepare new scientists and professionals to overcome these challenges in the appropriate academic settings (Doerfert, 2011).

The constant interaction between globalization and agricultural systems has resulted in an increased demand by agribusinesses for employees with international experiences and their ability to address diversity and agricultural related issues. This increased demand has serious implications for agricultural education at colleges and universities, pushing them to internationalize their programs (Whigham & Acker, 2003). Internationalization of education refers to the steps taken to address the world's interactions and keep up with global trends (Altbach & Knight, 2007; Navarro, 2004; Olson & Evans, 2007). This term tends to be mistaken with globalization of education (Altbach, 2004). Navarro (2004) explained the difference between these two concepts and their interrelation:

“Globalization is what is happening in the world; it is the disappearance of boundaries between peoples, countries, and issues, the easier and faster communication between all parts of the world, the homogenization of the world, the interdependency of the world. Internationalization is what has to be done in order to adapt to this new system” (2004, p. 18).

In 2000 the North American Free Trade Agreement (NAFTA) published a bulletin indicating for the U.S. to succeed in the 21st century, citizens need to have international and cross-cultural awareness (Wingenbach et al.,

2003). The U.S. is likely the most active nation aiming to provide cross-cultural education (Altbach & Knight, 2007). The National Academy of Sciences' Committee on Agricultural Education indicated that internationalizing the agricultural sciences education in the U.S. promotes agricultural literacy, which subsequently supports the industry's ability to compete globally (Frick, Birkenholz, & Machtmes, 1995). In contrast, the Latin American (L.A.) educational system faces the same challenges as U.S. universities when it comes to preparing students for a global context (Torres & Schugurensky, 2002). However an additional challenge is the ability to access the needed resources to conduct research and countries' abilities to provide job opportunities (De Wit, 2005). Agricultural departments in L.A. universities started in the mid-1850s similar to the U.S. yet have not seen the equivalent growth of their U.S. counterparts. Initially, this discrepancy is assumed to be the result of the separation of higher education and extension, social unrest at national and local levels, lack of availability of funds, and insufficient faculty (Rio, 1964). Currently, a higher emphasis has been placed on higher education in L.A., but the region remains behind developed countries. Challenges in the region continue to be similar, but are now more focused on the out-of-date curriculum, the need for teaching material, insufficient faculty, and how to introduce graduates into the professional market (Holm-Nielsen, Thorn, Brunner, & Balán, 2005).

Over the years researchers have suggested to internationalize education by incorporating classes focusing on global issues, study abroad programs, internships, diversity on campus, and others (Acker & Scanes, 2000; Whigham & Acker, 2003). Study abroad programs have become an important element in students' global education; several studies have evaluated the significance and impact of study abroad programs (Klein & Lawver, 2007; Brooks, Frick, & Bruening, 2006; Kitsantas, 2004; Opper, 1990). However, only one percent of students majoring in agricultural sciences participated in study abroad programs during the 2011-2012 academic year (Institute of International Education, 2014). This suggests that other ways should be explored to internationalize students' agricultural sciences curriculum, such as was suggested by Wingham and Acker (2003). Moreover, Olson and Evans (2007) suggested that academic institutions should have within their faculty, educators who understand current global trends and world implications, to effectively teach students the complex interactions of globalization and its impacts. Over the years, researchers have assessed college students' knowledge of international agricultural issues and their awareness. Findings have consistently found a lacking of knowledge among students (Hurst & Roberts, 2013; Radhakrishna & Dominguez, 1999; Wingenbach et al., 2003).

This research study was based on the Theory of Planned Behavior by Ajzen (1985) and it is supported by the Human Capital Theory by Adam Smith (1776). The Theory of Planned Behavior explains "individuals' intention to perform a given behavior; intentions are assumed to capture the motivational factors that influence behavior" (Ajzen, 1985, p. 181). According to Ajzen (2006), behavior is guided by three considerations: behavioral beliefs, normative beliefs, and control beliefs. In this study, the researchers focused on the students' knowledge of international agricultural issues as part of their control beliefs, which refers to the "beliefs about the presence of factors that may facilitate or impede performance of the behavior and the perceived power of these factors" (Ajzen, 2006, p. 1). The application of the Theory of Human Capital lies in the hypothesis that states, "[the] pursuit of education leads to individual and national economic growth" (Sweetland, 1996, p. 356). Moriba (2011) proposed, following the Human Capital Theory, if investments in education are done for the purpose of advancing a nation's economy, then we might assume that investments in an internationalized education are done with the purpose of helping a nation keep up with a globalized world.

Purpose and Objectives

The purpose of this research study was to assess and compare U.S. and L.A. students' knowledge of international agricultural issues. The following objectives guided this study:

1. Describe students enrolled in agricultural sciences at U.S. and L.A.
2. Assess and compare students' knowledge of international agricultural in the U.S. and L.A.
3. Determine if there is a significant difference in students' overall knowledge of international agricultural issues by academic institution.
4. Determine if there is a significant difference in students' knowledge of international agricultural issues by academic standing.

Methods

The study design for this project was causal-comparative; which is used to identify cause and effect relationships, with the critical feature of an independent categorical variable (Gall, Gall, & Borg, 2007). This study was part of a larger study that sought to assess and compare U.S. and L.A. undergraduate students.

The targeted population were undergraduate students' enrolled in agricultural sciences at a Texas Tech University (TTU) and Zamorano University (EAP). A non-probabilistic convenience oversample of students in classes with large numbers of enrollment was taken at both academic institutions. The researcher used this procedure to prevent sampling error by maximizing participant response rate. Findings by Sax, Gilmartin, and Bryant (2003) highlighted the low response rates among college students in paper-only instruments and web surveys. Therefore, the researcher oversampled the population following the guidelines by Bartlett, Kotrlik, and Higgins (2001). General data collection procedures were established to maintain consistency between groups. A total of 1,300 students volunteered to complete the instrument. Instruments with less than 90% completion were considered invalid and eliminated. Students who opted not to participate in this research study were considered non-respondents, based on enrollment records of the chosen classes at both academic institutions. Students' in more than one class were considered duplicates and were asked not to complete the instrument more than a single time. An overall non-response rate of 10% was obtained. No control for non-response error was followed in this study as participants were part of a convenience sample with no way to contact the non-respondents given IRB constraints.

In order to evaluate students' knowledge of international agricultural issues, the researcher used a modified version of the International Agricultural Awareness and Understanding instrument by Wingenbach et al. (2003) and Hurst (2013). The original instrument consisted of three section assessing knowledge, attitudes and beliefs of international agricultural issues. The knowledge section of the instrument consisted of "20 multiple-choice, knowledge questions related to international agricultural policies, products, peoples, and culture" (Wingenbach, 2003, p. 27). Questions no longer relevant were replaced with others addressing issues highlighted by the Food and Agriculture Organization of the United Nations (FAO) in 2014, in the post-2015 development agenda, and the Millennium Development Goals (MDG). A comprehensive literature review was conducted to find the most accurate and recent information per question selected. A panel of experts from TTU and Texas A&M evaluated the final instrument for face and content validity. A demographic section was included consisting of students' gender, academic standing, major, ethnic background, international experiences and language proficiency. For the purpose of this study, only the demographic characteristics of academic standing will be reported. The final instrument was originally developed in English and translated into Spanish by a Spanish-speaking native person with background in agriculture in L.A.

The descriptive statistics of central tendency and variability were used to describe and assess students in terms of their demographic characteristics and knowledge of international agricultural issues. An independent t-test was used to determine if there was a significant difference between students' overall knowledge scores based on their institution of enrollment. The null hypothesis indicated there was no difference in the participants' correct knowledge of international agricultural issues ($H_0: \mu_1 = \mu_2$). An ANOVA was conducted to evaluate mean differences between students' knowledge scores by academic standings. The null hypothesis stated there would

be no significant difference in the participants' correct knowledge of international agricultural issues based on their academic standing ($H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$). An alpha level of .05 was established *a priori* for significance.

Results

Research objective one sought to describe participating students' demographic characteristics. For the purpose of this study only the students' gender and academic standing is reported. A total of 1,218 students completed the instrument, 616 (50.2%) from TTU and 606 (49.8%) from EAP. Overall, the majority of the participants were males (53.8%), however in TTU the majority were females (56.8%) and in EAP were male (64.6%).

In terms of students' academic standing, the overall majority of the students' classified themselves as freshman ($n = 356$), followed by sophomores ($n = 324$), juniors ($n = 261$), and seniors ($n = 255$). Freshman students were also the majority at TTU ($n = 214$), but in EAP seniors were the majority ($n = 195$). Twenty-two of the participants did not specify their academic standing. Table 1 summarizes students' academic standing by academic institution.

Table 1

Summary of Students' Academic Standing

Characteristic	Total ($n = 1196$)		TTU ($n^1 = 593$)		EAP ($n^2 = 586$)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Freshman	356	29.8	214	35.4	142	24.0
Sophomore	324	27.1	180	29.8	144	24.0
Junior	261	21.8	150	24.8	111	18.8
Senior	255	21.3	60	9.9	195	32.9

Note. n^1 sample of participating students at TTU. n^2 sample of participating students at EAP.

Research objective two assessed the participating students' knowledge of international agricultural issues based on their academic standing. Students' answered 20 multiple-choice items. Results were coded as correct and incorrect with a binary code of 1 and 0, respectively. Therefore, the sum of correct answers resulted in the overall knowledge of international agricultural issues score based on 20 possible points.

Overall, the majority of the students' (90.4%) responded correctly to the item "the _____ desert is the world's largest hot desert". While, the question receiving the most incorrect answers was: "Although large areas of land are brought into cultivation throughout the world each year, large amounts are also rendered useless or are reduced in productive capacity because of the following reason", only 5% answered this question correctly. These two questions were the most correct and incorrect answered items at both academic institutions. See Table 2 for a summary of students' correct knowledge of international agricultural issues per question.

Table 2

Summary of Students' Correct Knowledge of International Agricultural Issues

Question	Correct Answer	Total	TTU	EAP
		(n = 1218)	(n ¹ = 612)	(n ² = 606)
		%	%	%
11. The ___ desert is the world's largest hot desert.	Sahara	90.4	86.9	93.9
2. What is the primary household fuel in lower income groups in Latin America?	Wood	72.2	58.8	85.6
6. Which of the following languages are the four most spoken languages worldwide?	Chinese, English, Hindi, Spanish	56.4	64.1	48.7
8. These countries are part of the European Union?	France, Ireland, Italy, Sweden	47.0	42.2	52.0
19. Worldwide population will be approximately ___ billions by 2050	9	46.9	45.3	48.5
12. What country produces the largest volume of swine?	China	46.2	40.7	51.8
20. Which of the following food nutrients is most lacking in the diets of the world's population?	Proteins	41.9	43.1	40.6
7. In what part of the world are you most likely to find a hand-dug underground irrigation system called a ghanat (qanat) that may extend for many miles from the mountains to fields out to the plains?	Middle East	39.9	26.5	53.5
14. Considering developing and developed countries, the projection of the world population for the year 2050 shows that the largest segment will be in:	Asia and Oceania	38.1	46.1	30.0

Table 2 continued

Question	Correct Answer	Total	TTU	EAP
		(<i>n</i> = 1218)	(<i>n</i> ¹ = 612)	(<i>n</i> ² = 606)
		%	%	%
18. Worldwide food production need to increase at least ___% to meet global food demand in 2050	60	36.7	37.7	35.6
15. Which country is the largest producer of tea?	China	36.5	29.2	43.7
17. The economic strength of a country can be measured by	Gross national product (GNP)	35.1	24.5	45.9
13. Which cereal grain is the basic food for more than half of the world's population?	Rice	34.7	45.3	24.1
5. Which means of communication currently reaches the largest number of people throughout the world?	Radio	32.6	38.7	26.4
1. Who carries out most of the field work on an African farm?	Women	30.9	37.1	24.6
16. In East Africa, it is expected that everyone will ___ upon greeting each other at a meeting, and upon departure from meetings.	shake hands	19.5	13.2	25.9
3. As of 2013, what percentage of the world population suffers from chronic hunger?	12%	18.4	14.9	21.9
4. Which of the following is the major reason why more countries in Asia, Africa, and Latin America have become net food importers in the last 50 years?	A production shift from food to cash crops earns money to offset trade imbalances	14.4	12.3	16.5
10. Which food sector uses a greater variety of biological diversity?	Capture fisheries	13.5	10.3	16.7

Table 2 continued

Question	Correct Answer	Total	EAP	TTU
		(<i>n</i> = 1218)	(<i>n</i> ¹ = 612)	(<i>n</i> ¹ = 606)
		%	%	%
9. Although large areas of land are brought into cultivation throughout the world each year, large amounts are also rendered useless or are reduced in productive capacity because of the following reasons:	lack of sufficient farm labor	5.0	6.7	3.3

Note. *n*¹ sample of participating students at TTU. *n*² sample of participating students at EAP.

Overall, senior students' obtained the highest mean score ($M = 7.95, SD = 2.11$), followed by juniors ($M = 7.93, SD = 2.19$), sophomores ($M = 7.48, SD = 2.14$), and freshmen ($M = 7.10, SD = 2.03$). Similar to the overall results, TTU students' highest mean score was obtained by seniors ($M = 7.58, SD = 2.20$), whereas junior students at EAP gained the highest mean score ($M = 8.77, SD = 2.07$). See Table 3.

Table 3

Summary of Students' Correct Knowledge of International Agricultural Issues by Academic Standing

Characteristic	Total		TTU		EAP	
	(<i>n</i> = 1196)		(<i>n</i> ¹ = 593)		(<i>n</i> ² = 586)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Freshman	7.10	2.03	7.12	2.24	7.06	1.69
Sophomore	7.48	2.14	7.18	2.15	7.85	2.08
Junior	7.93	2.19	7.32	2.25	8.77	2.07
Senior	7.95	2.10	7.58	2.20	8.06	2.02

Note. *n*¹ sample of participating students at TTU. *n*² sample of participating students at EAP.

Research objective three focused on determining if there was a significant difference in students' overall knowledge of international agricultural issues by academic institution. An independent *t*-test was used to assess the statistical significance in the students' knowledge of international agricultural issues scores based on their academic institution of enrollment. The null hypothesis indicated there was no difference in the participants' correct knowledge of international agricultural issues ($H_0: \mu_1 = \mu_2$). The alpha level was set at .05 *a priori*. Levene's test for equality of variances was significant ($p = .03$). The corrected *t*-test was used not assuming homogeneity of variance. This corrected independent *t*-test reported a *t*-value of -5.46 ($p = .01$). Therefore the

null hypothesis was rejected in favor of the research hypothesis stating that, in the population, there was a significant difference in the participants' knowledge of international agricultural issues if they are enrolled at TTU or EAP ($H_0: \mu_1 \neq \mu_2$). Table 4 displays the obtained results.

Table 4

Independent t-test for Students' Knowledge of International Agricultural Issues (n = 1196)

Characteristic	<i>t</i>	<i>df</i>	<i>p</i>
Knowledge	-5.46	1207.62	.01*

* $p < .05$

Research objective four sought to determine if, overall, there was a significant difference in the students' knowledge of international agricultural issues by academic standing. A one-way ANOVA was conducted to compare the mean scores of students' knowledge based on their academic standing. The independent variable had four levels based on the students' academic standing: freshman, sophomore, junior, and senior. The dependent variable was the total amount of correct answers. The null hypothesis stated that, there would be no significant difference in the participants' correct knowledge of international agricultural issues based on their academic standing ($H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$). The alpha level was set at .05 *a priori*. Based on the findings, the null hypothesis was rejected in favor of the research hypothesis, suggesting that there was a significant difference of students' knowledge based on their academic standing, $F(3, 1192) = 11.49, p < .05$. See Table 5. A post hoc analysis was conducted to evaluate differences among the means. The assumption of homogeneity of variance was met $F(3, 1192) = 1.32, p = .27$. A Tukey HSD test indicated that freshmen and sophomores are significantly different ($p < .05$) than juniors and seniors.

Table 5

One-way Analysis of Variance of Students' Knowledge Scores by Academic Standing (n = 1196)

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between groups	3	154.04	51.35	11.49	.01*
Within groups	1192	5325.87	4.47		
Total	1195	5479.91			

* $p < .05$

An ANOVA was conducted to assess if there was a significant difference in students' academic standing by academic institution. In the case of the TTU, no significant difference was found among the students' academic standing ($H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$).

In the case of the EAP students, the results indicate there was a significant difference between students' academic standing, $F(3, 588) = 16.80, p < .05$. The Levene's test for homogeneity of variance indicated a significant difference, therefore, based upon the recommendations by Field (2005), the Dunnett's T3 test was utilized due to its tight control over Type I error. The results confirmed that freshmen, juniors and seniors were similar, and significantly different than juniors ($H_0: (\mu_1 = \mu_2 = \mu_4) \neq \mu_3$). See Table 6.

Table 6

One-way Analysis of Variance of EAP Students' Knowledge Scores by Academic Standing (n² = 592)

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between groups	3	189.66	63.22	16.80	.01*
Within groups	588	2212.66	3.76		
Total	591	2402.32			

Note. n² sample of participating students at EAP.

* $p < .05$

Discussion

The results obtained in this research study should be taken with caution and should not be generalized to other populations as non-random assignment procedures were used. In addition, data fell outside the bounds of normality, appearing to be positively skewed; the researchers considered this within the parameters of the design of the study and therefore acceptable. Nonetheless, these results describe well TTU and EAP students.

Knowledge of international agricultural issues was found deficient among students. Only 3.6% of the total population obtained a passing score above 60% as was identified by Wingenbach et al. (2003), 3.5% at TTU and 3.7% in EAP. The overall mean score was 7.6, indicating the average number of correctly answered questions out of the 20 knowledge items on the instrument. These low scores on knowledge items are consistent with previous studies. Hurst (2013) found low mean scores in her study; on average 8 items were correctly answered out of 20, and only 6.5% of her participants obtained a passing score. While, Wingenbach et al. (2003) found only 5% of the students obtained a passing score after taking an international agriculture course. An increase in correct answers was observed in this study at both academic institutions, based on the students' academic standing. Overall, results suggests freshmen and sophomore students are similar, while junior and seniors are similar. These two groups were significantly different but still, a low proportion of students' obtained a passing score. Wingenbach et al. (2003) suggested that students' may not be able to connect the information received in classes and media to the instrument, consequently accounting for the obtained results. This can possibly be the case in this study as well. This may be disadvantageous for students entering a labor force that demands skillful employees, able to apply their technical knowledge and be internationally proficient. Olson and Evans suggested that "students' should be able to think, work, and operate across boundaries" (2007, p. 14). Elting (2001) recommended that the undergraduate curriculum needed to provide the students with the required knowledge and awareness to engage in a global context. Findings in this study suggests, following Elting's (2001) discourse, that students' lacking knowledge may interfere with their ability to engage in a global context if entering the professional world immediately. This lack of knowledge, specifically in terms of international agriculture, is not uncommon among U.S. students as was concluded by Wingenbach et al. (2003).

Both academic institutions should provide students' with the needed knowledge of international agricultural issues, by further internationalizing their curriculums to effectively engage students in an understanding of global issues and their implications to the world. The internationalization of the higher education curriculum goes beyond the commercialization of education as a commodity and beyond the curriculum (Olson & Evans, 2007). It involves faculty engaging with the world (Whigham & Ackers, 2003), developing partnerships to conduct research and encourage educational opportunities for students and faculty, as well as the potential

recruitment of international students and faculty to foster a multicultural environment on campuses around the globe (Altbach & Knight, 2007; Olson & Evans, 2007; Whigham & Ackers, 2003). The internationalization of education will remain as a central force in future years and will most likely be affected by multiple factors such as, the global political realities, policy, cost of study, domestic capacity, expansion of the English language, e-learning initiatives, private sector, quality assurance, and the internationalization of curriculum itself (Altbach & Knight, 2007). It is recommended to further explore students' knowledge of international agricultural issues by identifying courses with international dimensions that may expand students' knowledge to an international context, as well as other factors that may potentially influence their understanding, such as study abroad program. This can potentially position graduates from TTU and EAP as skillful and competitive employees in a constantly evolving world.

In addition, further research is needed to identify the most appropriate instrumentation to measure accurate knowledge of international agricultural issues held by students. The reliability analyses conducted to assess the instrument internal consistency in the pilot test and at post-hoc found were negligible (KR-20 = .23; KR-20 = .14). According to Frisbie (1988) it is common in instruments measuring achievement to yield low reliability coefficients, around .50, which for teacher-made test is tolerable when combined with other information to score students' knowledge. Furthermore, he suggested to researchers obtaining low reliability coefficients to not use results with confidence to make conclusions. However, it is important to highlight findings by previous researchers whom have also analyzed reliability, finding low coefficients on knowledge tests (Hurst, 2013), as well as others that have opted not to reported reliability analyses (Wingenbach et al., 2003; Redmann, Schupp, & Richardson, 1998; Frick et al., 1995). The researchers considered that other potential sources of measurement errors may be influencing the students' knowledge scores, such as participants' characteristics and testing conditions.

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Teaching with Animals: The Role of Animal Ambassadors in Improving Presenter Communication Skills

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Abstract

Much is known about the benefits of interacting with animals for learners. However, little is known about the animals' potential influence on the communication ability of the presenter/educator. The purpose of this qualitative study was to describe the experience of undergraduate students who used live animals (baby chicks, turtles, salamanders, and non-venomous snakes) during in-class and outreach presentations and the animals' role in influencing their communication ability. The influence of an instructor who teaches with such animals was also examined. A purposive sample of students enrolled in an introductory environmental education course open to all majors was obtained and five students agreed to participate in semi-structured interviews. Once audio was recorded and transcribed, the constant comparative method was used to analyze the data. Six reoccurring themes emerged. Presenting with a live animal (1) helped students feel less nervous while teaching, (2) increased presenter confidence, (3) promoted flexibility while teaching, (4) encouraged audience analysis, (5) helped create a positive, comfortable learning environment, and (6) influenced student career decisions. These themes aligned with Bandura's triatic reciprocity model. Pre-service teacher education programs should consider using small, live animals, when relevant, with apprentice teachers as they equally benefit the presenter and learning environment.

Introduction/Literature Review

When used in teaching, live animals can provide a memorable learning experience. In the formal (indoor/classroom) setting, captive live animals can enhance learning, strengthen feelings of empathy and compassion, and build skills in responsibility (Daly & Suggs, 2010; Fuhrman, 2007; Fuhrman & Ladewig, 2008; Hummel & Randler, 2012). In the nonformal (outdoor/non-classroom) environment, animals used as teaching tools can enhance the relevance of local conservation efforts targeting specific species and habitats and increase attendance at program activities (Dierking, Burtnyk, Buchner, & Falk, 2002; Siegel, 2004; Swanagan, 2000). Animals can also elicit physiological responses in participants. When used in either setting, companion animals can decrease blood pressure, lower heartrate, lessen feelings of homesickness, and enhance one's outlook on life (Siegel, 2004; Von Bergen, 2015). Although animals are often used in formal and nonformal presentations delivered by agricultural and environmental educators, it is unknown whether live animals used during such presentations could positively influence the presenters' communication ability.

The ability to communicate with diverse audiences is a skill required of nearly every occupation. However, college students graduating today lack many essential communication skills needed in the workplace (Brooks, Flanders, Jones, Kane, McKissick, & Shepherd, 2008; Crawford, Lang, Fink, Dalton, & Fielitz, 2011; Guenther & Moore, 2005; Schneider, 2015; Thomas, 2010). Of the types of communication skills desired by employers, effective oral communication is one of the most important (Crawford et al., 2011). Mangan (2007) called on college faculty to strengthen these "soft skills" in college students and Dwyer and Davidson (2012) more recently suggested that faculty should train students in public speaking specifically. Given the need to strengthen communication skills in college students, undergraduate students at the University of Georgia served as a relevant audience for this study.

Public speaking skills are of particular importance in the agricultural and environmental fields (Kaufman, Rateau, Ellis, Kasperbauer, & Stacklin, 2010). The act of public speaking may increase one's communication apprehension, and college students are no different from others in their anxiety with speaking before their peers. However, animals may offer support for reducing stress like the apprehension associated with public speaking. In fact, experts encourage those with communication and other fears to interact with live animals to overcome

their anxieties (Mallon, 1992; Meadan & Jegatheesan, 2010). When considering whether handling stuffed (toy) animals would lower student anxiety when compared to handling live animals, Shiloh et al. (2003) found that petting live animals was more effective at reducing anxiety and thereby enhancing communication skills. Interestingly, touching a live turtle was just as effective at reducing anxiety as touching a live rabbit (Shiloh et al., 2003). With their generally smaller size and transportability, reptiles and small mammals can be used in classrooms and offer promise in enhancing the communication abilities of college students engaged in public presentations.

One explanation for the potential effectiveness of live animals in reducing communication anxieties and improving a presenter's overall speaking skills is the distractor factor. Live animals may serve to distract the handler away from potential sources of anxiety like those experienced during public speaking and allow the speaker to focus more on delivering their educational message. Live animals are "ideally suited for a distraction role because...they are complex, unpredictable, interactive, and operate on tactile, auditory, visual, and probably other levels" (Shiloh et al., 2003, p. 392). This aligns with Brickel's (1982) attentional shift hypothesis which suggests that interacting with animals can reduce anxiety by diverting attention away from stressful stimuli.

Although much is known about the benefits of interacting with animals for learners, little is known about the animals' influence on the educator/presenter. Shiloh et al. (2003) called for additional research on the influence of touching live animals like rabbits and turtles on reducing anxiety. Daly and Suggs (2010) recommended that additional studies be conducted on the use of companion animals to enhance communication skills. Most recently, Hummel and Randler (2012) encouraged additional research on the use of different animal species from different taxonomic classes on one's motivation to communicate. The need to strengthen communication skills in college students, the potential for animals to aid in reducing communication anxiety of those engaged in public speaking, and the lack of research on an animals' influence on the presenters' communication ability prompted this study.

Theoretical Framework

Bandura's (1986) Social Cognitive Theory proposed that learning occurs through interactions between the individual, behavior and the environment (see Figure 1); enactive and vicarious learning; and through observation, modeling, and imitation. Bandura elaborated that the reciprocal interactions between the individual, behavior, and environmental factors all influence the outcomes of the learning experience. Therefore, a teacher must consider the environmental factors that exist as they prepare a lesson and how those environmental factors will influence the behavior being taught (Schunk, 2012). In this study, the learners were engaged in a course that was established utilizing Bandura's triadic reciprocity model as a theoretical underpinning.

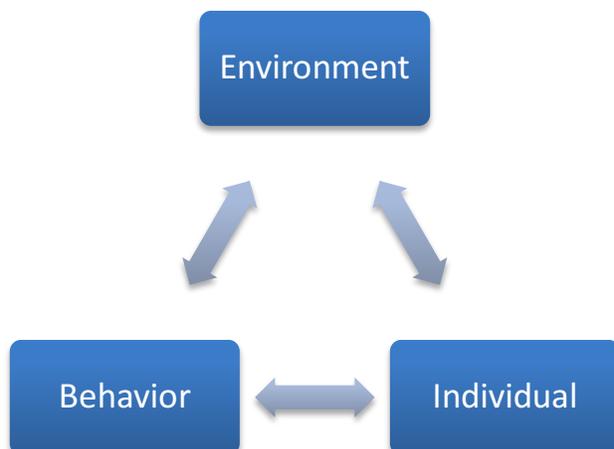


Figure 1. Triatic reciprocity model (Bandura, 1986)

Bandura (1986) posited that to enhance the learning environment and promote student learning, educators should utilize enactive and vicarious learning experiences. When utilizing enactive and vicarious learning experiences, Bandura proposed the utilization of modeling, observational practices, and student imitation of behaviors. Therefore, the researchers developed enactive and vicarious educational experiences for students to promote engagement and cognitive development. Vicarious learning experiences were developed as opportunities to witness the instructor and other guest speakers demonstrate presentation skills and utilization of animals as teaching tools. Each skill was modeled for the learner's observation, followed by an opportunity for learners to imitate the same behavior with stuffed animals and finally with live animals, all within the confines of the classroom environment. Each of the enactive learning experiences were video recorded for students to self-reflect on their skill development, as well as receiving constructive feedback from the instructor.

Purpose and Objectives

The purpose of this qualitative study was to describe the experience of undergraduate students who used live animals during presentations and the animals' role in influencing their communication ability, substantiated by Priority Area Four of the National Research Agenda (Doerfert, 2011). This study was guided by the following research questions:

1. What influence does presenting with a live animal have on the presenter's communication ability?
2. What influence does an instructor, who teaches with animals, have on students' presentation abilities in a classroom environment?

Methods

The course, "Animals in Education," trained students from a variety of majors in safely handling, transporting, and teaching with live animals. The animals were used as ambassadors of educational messages shared during presentations given in-class and before an audience of special needs youth. The educational messages shared by student presenters worked to move audience members from being aware of environmental issues regarding wildlife (e.g., habitat protection) to taking specific actions to alleviate such issues. Messages even related topics such as respecting others with physical differences to respecting animals with stereotypes (e.g., snakes). Students engaged in two team teaching activities (four students/team) where they developed a lesson plan taught first to an audience of 24 of their peers (in-class) and then before an audience of 10 to 12 youth with mental and physical disabilities at a local camp (outreach). Each presentation was videotaped and students reflected on their team's teaching abilities to revise their presentation before delivering it to the youth with special needs. Both presentations were designed for an audience at the second-grade level. Animal ambassadors used by students during their in-class and outreach presentations included baby chicks, land and water turtles, salamanders, and non-venomous snakes.

A purposive sample of undergraduate students enrolled in "Animals in Education," an introductory environmental education course (N = 28) was obtained (Koro-Ljungberg, Yendol-Hoppey, Smith, & Hayes, 2009). A total of five students agreed to participate in semi-structured interviews with one of the co-authors. Students were not interviewed by the instructor of the course to prevent influencing their responses. The University of Georgia Institutional Review Board approved the study protocol and all participants were provided written informed consent prior to participation in the study. Participants received no benefit or incentive to participate in the study.

Participants were asked to participate in a less than one-hour interview with a co-author of the study. The semi-structured interviews included 10 questions that examined the student's experience in the "Animals in

Education” course. The interviews lasted between 25 and 48 minutes in length and were conducted with students over the phone approximately four months following their participation in the course. Conducting interviews over the phone has been deemed a preferred collection method (Opdenakker, 2006). Following the interviews, the audio files were transcribed verbatim and each participant was assigned a pseudonym to ensure anonymity (Creswell, 1998).

The researchers utilized the constant comparative method proposed by Lincoln and Guba (1985) to analyze the data. Each researcher individually reviewed the transcripts and compared incidents applicable to each category. Together, the researchers then integrated categories and defined their characteristics or meaning. Following this, the researchers constructed the written form of the data in this manuscript. To ensure that the trustworthiness, credibility, dependability, and transferability of this study were upheld during the data collection and analysis processes, the researchers utilized several qualitative data collection best practices (Dooley, 2007; Lincoln & Guba, 1985). Specifically, participants were engaged in member checking to ensure that their responses were interpreted accurately and methodological journals were used to ensure the interviewer was consistent in facilitating each interview. Peer debriefing was also used to ensure consistency in the interpretation of themes which emerged from the raw data.

The researchers in this study were an Associate Professor and Assistant Professor with formal training in educational teaching and learning methodologies. Both researchers believe in the utilization of hands-on learning and building connections through experiential learning, including the utilization of animals in their teaching. Throughout their lives, animals have played an important role in their learning experiences and development as faculty members.

Results

All five participants were female and represented academic majors in both the biological and social sciences (Table 1). Pseudonyms have been used to protect participant identities.

Table 1
Demographic Characteristics of Interview Participants

Pseudonym	Academic Major	Year in School
Abby	Agricultural Economics	Senior
Becky	Wildlife Science	Junior
Carla	Agricultural Communication	Junior
Dana	Agricultural Education	Junior
Erica	Agricultural Communication	Senior

Six reoccurring themes emerged from the raw data regarding the influence that presenting with a live animal has on a presenter’s communication ability, including: (1) feeling less nervous while teaching with an animal, (2) increasing presenter confidence, (3) promoting flexibility while teaching, (4) encouraging audience analysis, (5) a positive, comfortable learning environment, and (6) influences on career decisions. Some overarching themes were further broken into subthemes to further describe participant experiences in using animals while presenting.

Feeling Less Nervous while Teaching with an Animal

Four of the five participants believed that using animals as ambassadors while teaching helped reduce their public speaking anxiety. Becky noted that teaching while handling an animal distracted attention away from a potential mistake she might make, saying, “it was a calming thing to know that most people are watching the animal instead of watching me. That way if I messed up I was less self-conscious about it, because they were

more focused on the animal.” Abby also mentioned, “it's different when you have an animal there because people are very interested in that and what's going on, so that calms you down because they don't care about what's going on with you.” Dana added, “...my nerves fade a lot quicker because it [handling the animal] gives me something else to concentrate on. I think students also, they're more engaged with you when you're not the only one up there.” Erica also shared that one of the benefits of handling a live animal while teaching was that the animal relieved tension because the presenter believed the audience's attention was equally focused on the animal. She noted,

It's easier than if you're just standing up there with empty hands because a lot of attention is on the animal. Even if you're up there assessing something, they're listening but they're also watching the animal to see what they're doing, how they're behaving. Not all the light is on you to perform or to teach. It makes it more comfortable to me to use an animal.

Increasing Presenter Confidence

Using a live animal in a teaching demonstration enhanced participants' confidence in their teaching ability. Knowing that the animal would be incorporated into their presentation seemed to also increase the presenter's enthusiasm to present information. For example, Dana shared, “I was always told that as a teacher I became more enthusiastic because I love teaching with animals. The students get so much more engaged. I guess my personality would change in it. I get more confident...I'd say teaching with animals increased my confidence.” As an agricultural education major, Dana participated in student teaching the semester following her enrollment in “Animals in Education.” She recalled a specific instance when she borrowed the animals she used in the course for one of the lessons she would teach at her cooperating school. Students at her assigned middle school had a history of disciplinary problems and she was nervous to teach them. Dana remarked,

I brought animals one day because I needed the confidence to teach in front of them. I was nervous. After I taught with the animals that day, I felt more confident because the kids responded to me. I feel I'm a better teacher after using the animals in that class.

Carla also mentioned the value of teaching with animals because she believed having an animal peaked students' interest in a lesson and thereby enhanced her own confidence to engage that audience. She shared, “If you pull in an animal that is something they've never seen before, new to them, that'll definitely get their interest...” From a teamwork standpoint, Erica noted that incorporating the animals into a lesson helped her and her teaching team's confidence in their preparation to teach. Having that live animal in front of the audience, “you have to practice out who is going to say what, where you're going to stand and who is going to hold the animal, when to transition so everything flows well. We did a lot of work outside of class to prepare.” She went on to add that such preparation, because of having the animals, enhanced the team's confidence in their presenting abilities.

The experiences of teaching with the animals increased participants' confidence in their teaching ability enough that some students willingly volunteered to continue using animals in teaching outside of the scope of the class. Becky volunteered to go help with an outdoor festival in the community and said that the experience of teaching with the animals in the class “helped her prepare mentally for what I needed to expect.”

Promoting Flexibility while Teaching

When teaching with any live animal, one must expect the unexpected. Several participants mentioned that handling the animals while teaching enhanced their skills in being flexible and adaptive. Carla declared that teaching with turtles, snakes, salamanders, and birds is “very different from public speaking just from the simple fact that there's that wild animal variable and you have to be able to be flexible and kind of roll with the punches rather than just having a speech memorized and just speaking.” For Erica, she shared that teaching

with live animals, “definitely taught me a lot about being prepared for things to not go your way or exactly how you prepared for them.”

When students in the “Animals in Education” course visited the special needs youth to share the presentation they had previously delivered before their peers in the classroom, they experienced the value of being flexible and the wisdom in capitalizing on teachable moments. Erica shared an example of her experience while visiting with the special needs youth and how the experience helped her become flexible in her delivery. She noted,

They [youth with special needs] slightly interrupt you, but then they say it and then you make a little comment about it and you can move on and keep teaching. It was interruptions, but it wasn't necessarily negative interruptions...we had to be flexible and address what they were saying or what they were doing and then get back on point and continue our lesson.

Participants in this study experienced the value in adapting to learner needs and questions and often used those opportunities to bring attention to an animal’s characteristic or behavior.

Encouraging Audience Analysis

Promoting curiosity and suspense. Several participants mentioned that the experience of teaching with animals forced them to consider their audience, their choice of animal ambassador, and the relevance of the animal to the associated learning objective. Carla shared,

Ah, like your audience, how old are they, are they going to be scared, that kind of thing. If you're working with children, pulling out a really big, long, strong snake may scare them. You want to consider what your audience type is. You want to consider kind of novelty I guess, is something that really pulls audiences in.

Abby also noted the novelty effect of the animal and its ability to promote curiosity and suspense among audience members, stating, “If you bring a snake or a turtle, most of them have never seen that, and that really gets them excited...they've got in trouble if it was outside and their mom's told them not to touch it so being there it excites them.”

Visible impact on audience members. Other participants shared how using the animals prompted visible non-verbal reactions from audience members—especially the special needs youth—that seemed to build their confidence. For Abby, holding a snake and teaching the youth with special needs was impactful because she was able to, “see his [special needs student] face connect right then was very...warm and fuzzy inside because we had taught him something that he didn't know.” Becky also mentioned the visible impact her teaching with the animals was making on the audience of special needs students, saying,

You could see the joy on their face that they were still being treated like a normal kid to be able to interact with a snake and with a turtle, and things that they wouldn't normally see. Then we'd be able to get on their level for them to learn.

Participants appreciated knowing that their efforts in teaching were making a visible difference. Some, like Dana, were impacted by what she observed in one handicapped student who had already interacted with the animals through another teaching team. This young man wanted to experience the animals a second time. Dana recalled,

I think how much it sticks with them because we were only speaking for five minutes...and he was so attentive and so engaged in the ones previously before us that he enjoyed sharing the information [with her]. I guess I wouldn't have thought somebody would have remembered all the information.

These observations of learners' verbal and non-verbal cues seemed to be a source of positive feedback for participants in this study and helped affirm that their methods were relevant and appreciated.

Positive, Comfortable Learning Environment

Each of the participants mentioned aspects of the classroom learning environment that were particularly memorable for them. Characteristics of the instructor surfaced as a reoccurring theme and became an influential factor in creating a positive, comfortable learning environment. Becky shared,

He's just so energetic with the animals. He just interacts with them and gives them personality. He gave a turtle a personality. Turtles are kind of just there and he was able to make you, I guess, fall in love and feel something for an animal that people normally would just kind of like toss aside because it moves so slow and they don't really care because it's a turtle.

Dana also mentioned the characteristics of the instructor and how he modeled behaviors that students valued and wanted to repeat in their own teaching. For instance, she shared,

Dr. XXX always taught that enthusiasm is contagious, and how you can take the driest subject, and if you're enthusiastic about it, it catches on...especially when I teach my students if I'm dry in what I'm saying then they're not going to be excited, but if I'm passionate and showing it in my voice and I'm letting them see that I'm enthusiastic, that does more than anything for students.

Dana went on to share an example of how she borrowed animals she handled during the course for use during one of her student teaching activities. She recalled her observations of the middle school students and their level of engagement, saying,

I've never seen a student engaged the whole entire time as when we brought in the turtles. They were all about it, and they wanted to see Mitsy [a tortoise] walk and they just thought it was the coolest thing ever. I just feel like even the most difficult students can be reached by animals.

Participants also noted connections they formed by working with the animals. The instructor's teaching behaviors, combined with the use of live animals, enhanced students' level of classroom engagement. Carla recalled how the animals heightened her attention and curiosity, noting,

I just find myself, in other classes where I find myself falling asleep or having attention difficulties or just not really feeling invested in the class, when you have the opportunity to work with animals, or to watch animals or to learn something new about animals and just form a connection with them, that really does keep you much more engaged in my experience at least, than a simple lecture class does.

Connections were also formed through students' work in their teaching teams. Teams planned and presented the lesson they would go on to teach to the special needs youth first before their peers in class—an opportunity for critique and feedback both on lesson content and animal use practices. When asked to recall what she will remember most about the “Animals in Education” course, Erica said,

The camaraderie with your entire class of people. I think you are cheerleaders and also critiques of each other. That brought us together because while we are critiquing each other in different exercises or after different lessons, we were rooting each other on and being respectful of one another.

The instructor allowed students to feel a sense of ownership in their teaching and independence in their choice of animals and teaching methods. Carla noted the value in this, sharing, “he makes you feel like you're important and that is so, so important in a teacher because it makes the student invested as well and that's

something that I want to learn to emulate in my life...”

Influences on Career Decisions

Finally, participants’ confidence in their teaching abilities and the experience of teaching with animals may have influenced and even strengthened their interest in a career path. For Becky, a wildlife science major,

It definitely helped for right now and in the future I will definitely be able to say that I can properly teach with animals, not even just like a classroom setting, like if I want to educate people about other animals...I could be able to apply what I learned in that class to other animals. I think it definitely has helped me decide what I want to do for a career.

For Carla, an agricultural communication major, the experience strengthened her career interests.

I think this class has kind of reinforced the ideas that I've already had of that I enjoy interacting with people and that I enjoy educating people about the environment. [...] I don't really know where I'm going yet. I know that seems crazy considering I'm about to graduate but we're figuring it all out as we go. [This class] helped me get that internship and what I've learned in the class will also help me do a better job in that internship.

Discussion, Conclusions, and Recommendations

Aspects of Bandura’s (1986) triatic reciprocity model emerged from the participant conversations in this study. Modeling on the part of the “Animals in Education” instructor helped to create a classroom *environment* where *individuals* could observe and then imitate his *behaviors*. Once outside of the classroom and participating in an outreach activity with special needs youth, participants recalled the feedback they received from the instructor and their peers back in the classroom and this seemed to help them identify non-verbal cues of the special needs youth and adapt their teaching accordingly. Participant comments regarding the positive, comfortable learning environment which they experienced helped to validate the relevance of Bandura’s model in the context of this study. Observing the instructor’s behaviors in the inclusive classroom environment also increased participants’ confidence as a teacher both with their peers and with the younger, special needs youth.

Rosenshine and Furst (1971) noted the importance of enthusiasm, opportunities for student practice, humor, and variability as aspects which the most effective educators exhibit. Participants in this study spoke specifically about each of these. More recently, Brain, Fuhrman, and De Lay (2009) found that educators who were flexible and adaptive in the nonformal environment had a longer lasting impact on learners. Participants in this study experienced the wisdom in capitalizing on teachable moments as their live animal ambassadors and audience of special needs learners were not always predictable.

Teaching with live animals can certainly provide a memorable learning experience. Although physiological responses were not measured in this study as they were in previous studies connecting animals and people (Siegel, 2004; Von Bergen, 2015), participants noted feeling less anxious while teaching with an animal. From the presenter’s perspective, holding the live animal prompted them to believe the audience would be less attentive to flaws in their teaching and serve as a distraction. Others have suggested that animals can pleasantly distract audience attention, reduce stress in the presenter, and serve as an object for demonstration (Brickel, 1982; Fuhrman, 2007; Meadan & Jegatheesan, 2010; Shiloh et al., 2003). Students in this study taught in teams and having other presenters in front of the audience may have also helped reduce anxiety by distributing attention off of just one presenter.

Although previous studies have examined the influence of handling and petting domestic, pet-like animals on human responses (e.g., Shiloh et al., 2003) and some have recommended additional research be conducted on

using companion animals in teaching (Daly & Suggs, 2010), using reptiles and amphibians was a newer inquiry area. The novelty effect of using the baby birds, turtles, salamanders, and non-venomous snakes may have influenced participants—both as audience members observing their instructor and peers teach with such animals and as presenters themselves. Several participants mentioned the verbal and non-verbal feedback they received from the special needs learners as they presented with certain animals. The audience’s unfamiliarity with the animal (as compared with a domestic pet dog, for example) and excited response upon viewing it for the first time may have given an extra boost of confidence to the presenter and helped them feel less nervous while teaching.

Recommendations for Research

Although not generalizable, these findings may be transferred to other teaching situations to enhance student communication skills and the overall classroom environment. Based on these findings, the following recommendations can be made for additional study involving live animals as ambassadors of educational messages:

1. Given the potential influence of previous experiences with specific animals, examine the potential influence of animal type (reptile vs. mammal, native vs. exotic) on the communication ability of a presenter who handles the animal.
2. The previous experiences learners had with specific animals were not examined in this study. Additional research is needed examining the potential novelty effect of different types of animals and the emotional responses elicited by such animals on the presenter/teacher and audience.
3. Although not reported here, students in the “Animals in Education” class referred to the animal ambassadors by name when discussing their impact as a teaching tool. A need exists to examine the influence of naming the animals on presenter and learner attachment to the animal.
4. Additional research is needed on the influence of an animal ambassador on a male presenters’ communication ability/skill and anxiety levels since only females were examined here.
5. Students in this study taught in teams of four. Additional research is needed examining whether similar outcomes are possible when students teach with an animal by themselves.
6. Finally, the influence of an animal ambassador on student content knowledge acquisition and retention should receive further investigation.

Recommendations for Practice

This study found that involving students in teaching demonstrations with live animals can benefit their communication abilities. The following recommendations can be made for those interested in involving students in presentations where live animals serve as a teaching tool to enhance an educational message:

1. When confronted with an audience of varying abilities and motivations, consider using a live animal to reduce daily distractions, focus attention (such as through an interest approach), and empower learners to interact with their instructor and animal visitor.
2. If confronted with a pre-service teacher who struggles with public speaking anxiety, using an animal as part of a teaching activity may reduce presenter anxiety while promoting curiosity and enthusiasm for learning among students.
3. Creating an environment where learners can feel comfortable making mistakes can be difficult. Using a live animal will encourage (and sometimes force) flexibility on the part of the instructor and allow learners to imitate that adaptability in their own presentations.
4. Create an environment where learners have the ability to engage at their own pace. While different animals can be utilized within a learning environment, some may cause fear and anxiety for certain learners (e.g., snakes). Ensure that all learners feel safe and secure when utilizing live animal ambassadors through the use of vicarious exposure beforehand.

5. Finally, when planning lessons, select an animal ambassador that will engage learners while ensuring that the novelty effect of the animal does not detract from the acquisition of knowledge.

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Identifying the Needs of Opinion Leaders to Encourage Widespread Adoption of Water Conservation and Protection

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Abstract

Opinion leaders are persuasive in convincing others within their social networks to adopt certain opinions and behaviors. By identifying and using opinion leaders, agricultural educators may be able to leverage individuals who have influence on others' opinions, thereby speeding up the adoption of new practices. In this article, we review a statewide survey to define opinion leaders and understand their current water conservation practices. Additionally, by using the theoretical framework of the diffusion of innovations, we explored what subject matter areas opinion leaders are most interested in, and where they go for more information. These findings will identify how agricultural educators can reach opinion leaders to help disseminate important water conservation information. The findings indicated opinion leaders have a good grasp on how to conserve water, but are still misusing water in terms of protecting its quality. Based on these findings it is suggested that agricultural educators develop educational programming focused on improving opinion leaders' knowledge of water pollution; a connection needs to be made between water quality and the environment.

Introduction

Florida's relationship with water has been historically complex. From early efforts to drain swamplands, to modern efforts to restore and conserve the natural environment, water defines the state (Baker & Behn, 2013). Over the years, residents have managed to drain, ditch, and divert so much water that there is not enough left in the ground for population growth, especially during times of drought (Barnett, 2007). Growth projections for Florida predict that over the next 30 years, demand for water in Florida will increase significantly due to a growing population (Sullivan, 2014). Groundwater over-pumping has led to emergencies in every region; South Florida suffers from saltwater intrusion, Central Florida is home to sinkholes and dried-up wells, and North Florida experiences bone-dry lakes (Barnett, 2007). The state has many water conservation initiatives in place, but there is still much that can be done to increase efficiency (Greene, 2010).

Florida has five water management districts established to manage regional water supply. Officials in four of Florida's five-water management districts report they do not have enough water to supply projected population growth past the year 2025 (Barnett, 2007). To supply water to more than 90 percent of the population, Florida relies on groundwater pulled up from aquifers underground. Today, Florida residents are pumping water out of their aquifers faster than the state's rainfall can refill them (Barnett, 2007). The state has concluded that additional demands for groundwater cannot be met without ecological damage to the aquifer (Overdeest & Christiansen, 2013). Repeatedly, opinion leaders in Florida's agricultural sector have identified water as the top issue of concern (Odera, Lamm, Dukes, Irani, & Carter, 2013).

Opinion leaders are unofficial leaders with the ability to influence other's decisions regarding the adoption of new products, practices, or ideas (Keller & Berry, 2003). In fact, in 1994 one opinion leader, Colonel Steve Monsees, convinced the Southwest Florida Water Management District's board members that groundwater could not last (Barnett, 2007, p.108). Monsees blamed the county government on piping groundwater south for public supply. He pleaded that "...all surface water is gone. All wetlands and marshes are gone. Most wildlife has disappeared. I [feel] violated and angry because of the loss of our lakes, ponds, wetlands, and wildlife. Please restore what is lawfully and rightfully ours" (Barnett, 2007, p. 108).

Opinion leaders tend to be persuasive in convincing others within their social networks to adopt certain opinions and behaviors (Keller & Berry, 2003). They tend to distribute information to their peers by upholding social norms. By identifying and using opinion leaders, agricultural educators may be able to leverage individuals who have influence on others' opinions, thereby speeding up the adoption of new practices (Rogers, 2003).

Research has shown when people are unsure of what to do they look towards others for guidance on how to act (Cialdini & Goldstein, 2004). Opinion leaders have the social power to influence potential early adopters. According to Rogers' (2003) theory of diffusion, individuals fall into one of five categories when it comes to changing behavior: innovators, early adopters, early majority adopters, late majority adopters, and laggards. Opinion leaders are often recognized as early adopters who actively seek out information to learn more about how behavioral change may influence their surroundings (Dalrymple, Shaw, & Brossard, 2013).

In this case, opinion leaders can serve as a vessel for communicating with the public about water related issues. They may be successful at persuading difficult-to-convince audiences, such as late adopters or laggards, to follow environmental policies and behaviors (Dalrymple et al., 2013). Opinion leaders may have the ability to encourage positive behaviors within social groups, while continuing to play a key role in the diffusion process.

To better understand how opinion leaders can inform the rest of the public, it is important to study the water issues of interest of opinion leaders. Sometimes opinion leaders will use what is referred to as informal learning, which may include interpersonal interaction, but at the very least opinion leaders stay up to date, are always willing to answer questions, and treat others as equals (Wadhwa, Ford-Jones, & Lingard, 2005). Water subject matter areas and methods of learning are largely under-identified for the opinion leader population. Opinion leaders can validate water issue practices and also facilitate the widespread adoption of suitable technologies (Wyckhuys & O'neil, 2007) therefore, it is important to further explore their needs to drive the development of effective programs. This research aligns with the fifth priority of the National Research Agenda (Doerfert, 2011), which strives to provide "efficient and effective agricultural education programs" (p. 10). The findings of this study can be used by extension educators to better develop programs targeting opinion leaders interested in water issues resulting in more effective programs.

Theoretical Framework

This research was based on the Theory of Diffusion of Innovation (Rogers, 2003). The theory is a social process explaining how information about a new idea is communicated and disseminated. As part of this theory, Rogers (2003) asserted that opinion leaders are more likely to be the first to participate in behaviors that could potentially influence their social networks. The dissemination of the new behavior occurs over time and can be seen as going through five distinct stages: persuasion, decision, implementation, and confirmation (Minisha-Majanja, 2005). Potential adopters must first learn about the innovation, be persuaded of the merits of the innovation, adopt it, implement it, and confirm the decision (Minisha-Majanja, 2005). Typically, early adopters are the initial group experimenting with innovations and new ideas and are usually comprised of opinion leaders (Rogers, 2003).

Early studies identified certain individuals who paid close attention to an issue, frequently discussed the issue, and considered themselves more persuasive in convincing others to adopt the opinion as opinion leaders (Katz & Lazerfield, 1955). These behaviors helped opinion leaders not only draw attention of others to a particular issue, but also, signal how others should respond to the issue (Nisbet & Kotcher, 2009). In this research we focused on *issue-specific opinion leaders* as identified by Katz and Lazerfield (1955). These leaders have involvement with a specific issue or topic, in our case Florida water conservation efforts, characterized by greater levels of media attention and specific knowledge.

Water topics itself fall largely under climate issues. Survey trends depict the American public is still largely disengaged from climate issues (Nisbet & Myers, 2007). In today's media world, the American public has greater access to quality information about water disparities, yet public concern remains low and citizens remain demobilized (Nisbet & Kotcher, 2009). Following Dalrymple et al.'s study (2013), we want to explore the potential role that opinion leaders play in advocating behavioral compliance among water users, beyond the influence of mass communication campaigns. We are looking at outlets that motivate opinion leaders to participate in environmental outreach activities so as to influence others (Dalrymple et al., 2013).

Dalrymple et al. (2013) looked at the role opinion leaders played in informing the public about aquatic invasive species in the Wisconsin lakes. This research focused on an opinion leader's internal efficacy (McCluskey, 2004). Individuals with high levels of self-efficacy are more motivated to seek out relevant information (Rimal, 2001) and influence behaviors. This study showed opinion leaders who have a strong sense of self-efficacy are important when encouraging behavior change (Dalrymple et al., 2013). Discovering opinion leaders interest in learning about water conservation will become even more important in increasing awareness of environmental issues and encouraging preventative behaviors.

Purpose and Objectives

The purpose of this study was to understand the types of water-conservation measures that opinion leaders show interest in and how they would like to learn about these practices. The results will help extension education develop programs that are interesting and engaging for opinion leaders. The research is guided by the following objectives:

1. Describe water issue opinion leaders within the general public in Florida.
2. Describe water conservation behaviors of opinion leaders.
3. Describe the organizations opinion leaders go to for information.
4. Identify the water issue subjects that opinion leaders are most interested in learning about.
5. Determine how opinion leaders want to receive information.

Methods

To reach the objectives of the study, an online survey was employed to residents of Florida aged 18 and older. The survey instrument included elements from several existing instruments including the Canadian water attitudes survey from the Royal Bank of Canada's Blue Water Project (Patterson, 2012), the National Water Survey Needs Assessment Program (Mahler et al., 2013), and the Government Style Questionnaire (Green-Demer, Blanchard, Pelletier, & Beland, 1994). As part of a larger study, five sections of the instrument were germane to this research study: the identification of water issue opinion leaders, their level of engagement in water conservation practices, the organizations they would go to for more information, the subject matter areas they were most interested in learning about, and how they would like to receive that information.

To identify water issue opinion leaders, respondents were given six statements and asked to select where on a five-point semantic differential scale between two phrases their attitude most closely aligned. A score of one represented a low level of opinion leadership represented by phrases such as "told no one", "never", "your friends tell you about water issues", "give very little information", "not at all likely to be asked", and "not used as a source of advice." A score of five represented a higher level of opinion leadership and was characterized by phrases such as "told a number of people", "very often", "you tell your friends about issues including new developments", "give a great deal of information", "very likely to be asked", and "often used as a source of advice." Results from the individual opinion leadership items were averaged to create an overall opinion leadership index score. Reliability of the opinion leadership scale was calculated *ex post facto* and resulted in a Cronbach alpha coefficient of .88.

To measure water conservation habits, respondents were asked to respond to a series of statements pertaining to water conservation practices on a 5-point Likert scale ranging from 1 = *Never*, 2 = *Almost never*, 3 = *Sometimes*, 4 = *Almost every time*, and 5 = *Every time*. Example statements included: “I turn the water off every time I brush my teeth”, “I avoid watering my lawn in the summer”, “I let my sprinklers run when rain is predicted in the forecast”, and “I hose down my driveway.”

Next, respondents were asked to identify where they went for water issue related information in an open-ended format. Respondents were asked to list the top three agencies or organizations they would approach or consult with for advice about water issues. Respondents were then provided a list of water-related topics and asked to indicate which of the following subjects they would most like to learn about. Respondents could check all that applied. Finally, respondents were asked their preferred methods for participation in learning about water topics. Respondents were given a list of topics they would most likely take advantage of if presented with the option. Again, respondents were allowed to check all that apply.

Prior to distribution, a panel of experts reviewed the survey instrument for internal validity. The panel included the Associate Director of the Center for Public Issues Education in Agriculture and Natural Resources at University of Florida, an Assistant Professor and Extension Specialist in Water Economics and Policy, the Director of the Center for Public Issues Education in Agriculture and Natural Resources at University of Florida, and the Assistant Professor for the Center for Public Issues Education in Agriculture and Natural Resources at University of Florida.

As previously mentioned, the target audience included Florida’s general public’s residents’ aged 18 or older. Qualtrics, a third party public opinion research company, distributed the survey by sending a link allowing access to the developed survey to 1,192 Florida residents. A 63% response rate was obtained ($N = 749$). In order to ensure the respondents were representative of Florida’s population according to the 2010 U.S. Census, the data were weighted to balance their geographic location, age, gender, and race/ethnicity (Kalton & Flores-Cervantes, 2003). This is a common procedure in non-probability sample selections to balance for selection, exclusion, and non-participation biases (Baker et al., 2013).

Results were analyzed using the Statistical Package for the Social Sciences (SPSS) version 22 and Excel. To identify the opinion leaders within the larger population, z-scores were run on the opinion leadership index. Respondents scoring below a negative one were assigned a one, those scoring between zero and one were assigned a two, and those scoring a one or above were assigned a three. The respondents assigned a three were considered the water issue opinion leaders and were used in further analysis. The responses to the water conservation behavior engagement, subject matter areas of interest and learning preferences were analyzed descriptively.

To analyze the open-ended responses related to where respondents went for water issues information, the results were compiled into an Excel spreadsheet and then combined into categories including City/town/local (city of., city, city council, mayor, city hall etc.), Water Agencies (includes water management, water department, water district), State Agencies (Government, DEP, State government, Fish and wildlife), County (County, county officials, county government), EPA (EPA, Environmental protection agency), and Non-profit groups (Water.org, Conserve Florida, Audubon, One Florida Foundation etc.). The number of responses within each category was tallied to describe where the respondents went for more information about water.

Results

Initially, respondents were asked to assess their self-identified level of opinion leadership using six questions on a five-point semantic differential scale where they had to indicate their response between two phrases. The scores to the six questions were averaged to create an overall opinion leadership index score that could range from one to five. A response of five indicated a high level of opinion leadership around water issues and a one a low level of opinion leadership around water issues. The mean score for the general public was 2.48 ($SD = .96$). A respondent was considered an opinion leader if they were one standard deviation above the mean. The 134 respondents that fell into this category were used for further analysis.

Description of Water Opinion Leaders

The identified opinion leaders were more likely to be female (57.1%) compared to male (42.9%). Most, 71.3%, were Caucasian/White (Non/Hispanic). Twenty-eight percent were between the ages of 20-29. The opinion leaders reported their political affiliation to be Democrat (55.2%) and their political beliefs to be moderate (48%) and were primarily located in South Florida or the St. John’s River Water Management District (67.8%). Additionally, 68.7 % were located in coastal counties of Florida.

Table 1

Demographics of Identified Opinion Leaders (N = 134)

	<i>n</i>	<i>%</i>
<i>Sex</i>		
Female	76	57.1
Male	57	42.9
<i>Race</i>		
African American	34	25.7
Asian	3	2.5
Caucasian/White (Non–Hispanic)	95	71.3
Native American	1	3.0
Other	4	3.2
<i>Hispanic Ethnicity</i>		
	43	32.1
<i>Age</i>		
18-19	3	1.9
20-29	37	27.9
30-39	28	20.6
40-49	26	19.5
50-59	14	10.5
60-69	15	11.3
70-79	6	4.2
80 and older	6	4.2
<i>Political Beliefs</i>		
Very Liberal	19	14.0
Liberal	24	18.0
Moderate	56	41.7
Conservative	24	18.1
Very Conservative	11	8.1
<i>Political Affiliations</i>		
Republican	23	17.2
Democrat	74	55.2
Independent	25	18.8

Non affiliated	12	8.8
<i>Water Management Region</i>		
South Florida WMD	44	33.5
St. John's River WMD	45	34.3
Southwest Florida WMD	35	26.7
Northwest Florida WMD	6	4.5
Suwannee River WMD	1	1.0
<i>Geography</i>		
Coastal	91	68.7
Inland	40	30.5

Engagement in Water Conservation Behaviors

Engagement in water conservation behaviors was identified by requesting respondents identify their level of conservation efforts with a series of ten statements on a five-point Likert-type scale. Table 2 displays their behaviors. The highest reported habits included turning off the water while brushing teeth, avoiding allowing motor oil to run down a storm drain, and avoiding flushing cooking oil down the toilet. The items with the most equal distribution were not showering for more than five minutes each time they bathe and leaving the water running in the kitchen when washing and/or rinsing dishes.

Table 2

Water Conservation Behaviors (N=134)

	Never or Almost		Almost Every
	Never %	Sometimes %	time or Every time %
I turn off the water while brushing my teeth	7.2	13.5	77.5
I shower for no more than five minutes each time I bath	26.4	30.0	41.8
I avoid watering my lawn in the summer	7.3	37.1	36.7
I leave the water running in the kitchen when washing and/or rinsing dishes	49.8	25.6	22.1
I allow soapy water to run down a storm drain	68.7	7.7	14.3
I let my sprinklers run when rain is predicted in the forecast	55.6	8.1	12.0
I let my sprinklers run when it has rained or is raining	59.8	3.4	11.5
I hose down my driveway	57.3	23.2	10.3
I allow used motor oil to run down a storm drain	81.0	1.4	10.7
I flush cooking oil down the toilet	81.2	4.5	10.0

Note. Respondents were allowed to indicate if a statement did not apply, therefore percentages might not equal 100%.

Organizations Opinion Leaders Use for Information about Water

Respondents were asked an open-ended question about what organizations they would go to for more information about water issues. The most reported organizations from opinion leaders were water agencies, state agencies, non-profit/NGO groups, City/town/local organizations, or County organizations. Sixty-nine out of 134 respondents indicated they would turn to water agencies such as their local water department and their regional water management districts first. This was closely followed by 63 opinion leaders reporting they would go to state agencies such as the Department of Health, the Department of Agriculture, the Department of Environmental Health, the Fish and Wildlife Commission, and the State of Florida government for more information. Forty-five opinion leaders reported going to non-profit groups such as Water.org, Conserve Florida, Audubon, and One Florida Foundation.

Subject Matter Areas of Interest

Respondents were asked what water subjects they would be most interested in learning more about. Results are shown in Table 3. Respondents were asked to select all that apply. Of the options presented, opinion leaders were most interested in restoring fish and aquatic habitat, home and garden landscaping ideas for Florida yards, and fish and wildlife water needs.

Table 3

Opinion Leaders' Subject Matter Areas of Interest (N = 134)

	%
Restoring fish and aquatic habitat	23.2
Home and garden landscaping ideas for Florida yards	22.8
Fish and wildlife water needs	22.3
Watershed restoration	20.4
Shore-line clean up	20.0
Water policy and economics	19.5
Community actions concerning water issues	16.9
Fertilizer and pesticide management	16.0
Watershed management	15.5
Forest management and water issue	14.1
Irrigation management	12.3
Landscape buffers	12.2
Private well protection	11.6
Septic system management	6.9
Other	0.6

Additionally, respondents were asked how they would like to learn about water issues. The results are displayed in Table 4. Overall, opinion leaders would like to learn through visiting a web-site, watching TV coverage or a video, or reading printed fact sheets, bulletins, or brochures.

Table 4

Opinion Leaders Preferred Modes of Learning (N = 134)

	Opinion Leaders %
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Visit a web-site	40.0
Watch TV coverage	34.5
Read printed fact sheets, bulletins, or brochures	24.9
Watch a video	24.9
Attend a fair or festival	22.4
Read a newspaper article or series	21.0
Take part in a one-time volunteer activity	15.3
Attend a short course or workshop	11.4
Get trained for a regular volunteer position	11.4
Look at a demonstration or display	11.9
Attend a seminar or conference	9.2

Conclusions, Implications and Recommendations

The results revealed self-reported water issues opinion leaders are predominately Caucasian and women. The largest age group identified within the opinion leaders were respondents aged 18 - 29 and they tended to be Democrats with moderate political beliefs. Additionally, opinion leaders were predominately from coastal communities and were a part of either the St. John's River or South Florida Water Management Districts.

Although self-designated survey scales are perhaps the least expensive and the easiest way for organizations to identify opinion leaders, the primary limitation is that respondents may overestimate or underestimate the actual degree of influence they have in their communication network (Nisbet & Kotcher, 2009). This being acknowledged, it is interesting to note many of the opinion leaders were younger compared to more seasoned residents. Previous research has shown younger individuals tend to be risk takers and more innovative in nature (Rogers, 2013) and therefore may be more engaged with taking action. Additionally, the majority came from east coast and southern coastal communities.

Perhaps the reason opinion leaders represent a younger generation is that water conservation has become more of a pressing issue in the past decades than in previous years (Baker & Behn, 2013; Barnett, 2007). This might imply that the younger generation has more access to mass media outlets such as social media or online news sources, which enables higher levels of opinion leadership compared to previous generations. As extension programs are developed around water issues, this should be kept at the forefront of planning to encourage the use of social media such as Facebook, Twitter, Instagram, etc., as a sharing platform.

Overall, the majority of opinion leaders engaged in water conservation behaviors by turning off the water every time they brush their teeth, not using sprinklers in advance of rain or after it has rained, and turning off the water when rinsing dishes and taking shorter showers. These results reveal that opinion leaders are cognizant of when they should be saving water. However, in terms of water quality conservation practices, the responses were different. While the majority responded positively to water conservation efforts, there is a portion still practicing wasteful water habits such as hosing down a driveway, allowing soapy water to fall down a storm drain, allowing used motor oil to fall down a storm drain, and flushing cooking oil down a toilet. This implies that even opinion leaders need continued exposure to understand why these particular habits are bad for the environment and should be addressed. Extension agents putting together water-focused programs should integrate educational experiences that stress the importance of protecting water resources in terms of water quality as well as conservation for water quantity.

As far as organizations available for more information, majority of respondents reported water management districts, state agencies and non-profit agencies as their top choices. The results revealed that opinion leaders are reaching out to non-profit groups over the Environmental Protection Agency or local city or county

organizations. It can be concluded that opinion leaders are more knowledgeable of water issues and therefore know of different organizations besides public offices. Even more significant was the complete lack of mentioning the Land Grant University within the state as a resource, or the Cooperative Extension Service more specifically. This implies that Cooperative Extension has some work to do if they want to be a go to resource for those having the most influence within their communities when it comes to water issues. This finding shows that opinion leaders, those most active in disseminating water-related information, are not using extension agents as a resource. Readily addressing this gap is highly encouraged through further research identifying opinion leaders' needs in this area and encouraging their use of extension materials.

Subject matter areas of particular interest to opinion leaders were restoring fish and aquatic habitats and fish and wildlife needs. The opinion leaders being predominantly from coastal communities may have played a role in this response and area of interest. This is a perfect example of the critical importance of protecting water resources in terms of water quality and water quantity. Extension agents have a role to play in educating this audience about how both efforts can have a positive effect on fish and wildlife habitat protection.

To learn more about these subject matter areas, opinion leaders would prefer to visit a web-site, watch TV coverage or a video, or read printed fact sheets bulletins or brochures. Traditionally, extension agents have focused on developing face-to-face interventions and educational opportunities, offering volunteer programs, and encouraging participation in workshops. Perhaps the development of short videos offered through an online medium that could catch the attention of opinion leaders in coast communities would be more effective. They would also be a medium easily shared by the younger generation through social media. Research examining the use of online resources and the amount of sharing that occurs as a result could further elucidate the time and effort it takes to create these materials. It is possible, that after engaging opinion leaders with informal learning techniques such as a website or video that face-to-face meetings could be set up to further interact with opinion leaders.

In order for any of the proposed actions to be successful, extension agents must motivate opinion leaders to promote the adoption of water conservation practices. Opinion leaders' attitudes will impact the adoption of innovation. Additionally, extension agents must continue to work with opinion leaders to better understand how they are convincing others to adopt water conservation practices. As opinion leaders will be drawing attention to others of the issue at hand, it will be helpful to work with them to understand and establish goals of how to disseminate the information.

Water issues are not only rampant in Florida, but across the nation and are a nationwide priority for extension agents to address. This research identified water issues opinion leaders within Florida but additional studies could examine if individuals within other states have the same characteristics and needs. Perhaps a national extension campaign could be created targeting this important audience should trends emerge. Additionally, the use of opinion leaders in spreading extension information has been limited. This research revealed water issues opinion leaders are not using extension resources and do not identify the Cooperative Extension Service as a place to go for information. Future research could explore why opinion leaders do not identify it as a source of information to assist in overcoming this issue.

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Experiences of Hispanic Students Enrolled in a College of Agriculture

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Abstract

Hispanics are projected to become the ethnic majority in Texas within the next decade. The purpose of this qualitative study was to determine the experiences of Hispanic students enrolled in a college of agriculture. The following research objectives guided the study: 1) determine Hispanic students' perceptions of experiences leading them to pursue a degree in agriculture; and determine Hispanic students' perceptions of experiences motivating them to remain in an agricultural degree program. During analysis of the data, three emergent themes were found among the factors influencing students: initial exposure to agriculture, family expectations, and program atmosphere and opportunities. The results showed that participants held more positive views of agriculture than found in previous literature, suggesting a possible difference in perceptions based on generation. Students also reported positive student/professor rapport influencing their decision to remain in the college of agriculture. Recommendations include: 1) more research should be conducted to better determine Hispanic students' perceptions of agriculture 2) the creation and implementation of teaching modules within teacher education programs to better prepare preservice teachers to navigate a diverse classroom 3) the implementation of a pre-college workshop at Sul Ross State University could positively influence Hispanic students' perceptions of a career in agriculture.

Introduction

Demographic forecasts in Texas project the Hispanic population is poised to become the ethnic majority by the year 2020 (Petersen & Assanie, 2005, p.37). They explained that as demographics shift, there are “far reaching implications for education, housing, and labor force” (Petersen & Assanie, 2005, p.37). Consequently, the *National Research Agenda* for agricultural educators emphasized the need to conduct research that “will examine the role of diversity and multiple perspectives in meaningful learning across agricultural education contexts” (Doerfert, 2011, p.9).

Secondary agricultural education programs have been “a traditionally important source of recruits” for agricultural colleges (Talbert & Larke, 1995, p.14), and can provide students with experiences likely to shape their perceptions of the food and fiber industry. Therefore, as students enter college they may already have pre-formed perceptions of agriculture, which could influence their choice of major or career within an agriculture related field. Talbert and Larke reported this is particularly predominant among ethnically diverse students. Thus, agricultural educators have a responsibility to respond appropriately in addressing diversity in the classroom and to counter negative images of agriculture. While many agree diversity in the agricultural classroom should be increased (National Research Council, 1988), no universal standard exists to define diversity. In terms of student population, “diversity refers to differences with respect to age, ethnicity, socioeconomic status, race, gender, physical and mental abilities, sexual orientation, spiritual practice and other human differences” (Bowen, 1994, p.17). Lack of ethnic diversity in agriculture programs is a complex issue. Negative images of agriculture and embedded biases among agricultural educators have been proposed as barriers to recruiting minority students into agriculture programs (Nichols, Jimmerson & Nelson, 1993; Whent, 1994).

Despite efforts to increase Hispanic student enrollment in agricultural education, overall participation is still low (Lawrence, Rayfield, Moore, & Outley, 2013; Roberts, Hall, Gill, Shinn, & Jaure, 2006). While national demographics appear to show equal representation of Hispanic students, school by school analysis indicates that Hispanic student enrollment increases in the regions with Hispanic dominant populations (Roberts, et al., 2006).

However, with support and resources, agricultural educators can “enroll Hispanic students and engage them in meaningful FFA activities” (Roberts, et.al., 2006, p. 78). Research is needed to examine the current perceptions of Hispanic students within secondary schools and colleges of agriculture to better understand the motivating factors leading to their decision pursue agricultural studies.

Theoretical Framework

The theory that best fit this qualitative study was social constructivism, which proffers that experiences are interpreted and created within the context of culture and serve to determine and explain human behavior (Geertz, 1973). Ostensibly, one’s culture should directly influence the lens through which they view the world steering the individual to assign or dismiss meaning to situations. The data collected during this study heavily reflected the model of triadic reciprocity, which illustrates the relationship between personal factors, behavior, and an individual’s environment. Triadic reciprocity explains that each of the three factors influence one another bi-directionally (Bandura, 1986). In terms of minority students’ choice of major, the model supported why students chose to major in agriculture and remain in an agriculture program based on their personal factors, environmental influences, and behaviors.

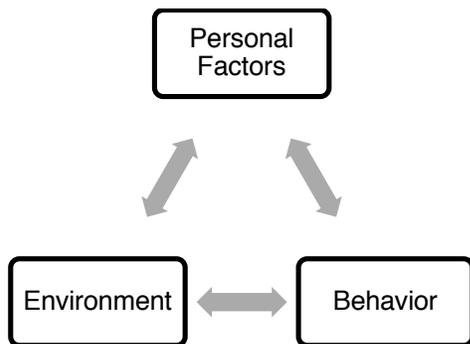


Figure 1. The model of Triadic Reciprocity. Adapted from Bandura (1986).

Literature Review

A call to action for increasing diversity in the field of agricultural education and within the food and fiber industry was initiated by the National Research Council’s (1988) *Understanding Agriculture: New Directions for Education*. Subsequent diversity literature has expressed the need for diversity. For example, Roberts, et al. (2006) reported that Hispanic students were underrepresented in agricultural education programs across Texas and should be actively recruited and engaged by agricultural educators. Additionally, they recommended that research be conducted to determine appropriate recruitment strategies to improve minority student enrollment and retention. However, few methods for increasing diversity or even a clear picture as to what the end result should be exist.

One impediment to increasing diversity in agricultural education may be students’ embedded biases (Whent, 1994). These biases can impact recruitment and retention of minority students, as well as how minority students perceive their place within a traditional agriculture program. As a result, Sutphin and Newsom-Stewart (1995) suggested that recruitment strategies should integrate cultural and gender sensitivity, however, a single focus recruitment approach might be most appropriate, instead of actively focusing on only recruiting students from specific racial or ethnic groups.

Another consideration with diversity in agriculture programs is what educational and programmatic practices support it? Luft (1996) suggested that cultural diversity within a program should be a goal of agricultural educators, but the outcome can only be enacted if the educators are adequately equipped for serving multicultural students. However, results of Luft's study found that in Nevada multicultural teaching practices were limited among teachers. Conversely, Salomon and Vargas (2014) found that Hispanic students in California had strong ties to their agricultural education programs. They expressed culture as a factor influencing their motivation and engagement in the classroom. They indicated that their teachers were well-equipped to handle diversity and appreciated that their family could connect culturally with their Hispanic, Spanish speaking FFA advisor, and that their FFA mimicked positive family dynamics creating a bond between Hispanic students. Participants also reported a positive relationship with their mentor, because of an openness and acceptance for students to join the chapter, regardless of background (Salomon & Vargas, 2014). The positive relationships described by Salomon and Vargas corroborates the findings of Estep and Roberts (2013) regarding teacher immediacy levels. Positive relationships between teachers and students can impact student motivation, including students' expectancy for success.

Several studies have established that minority students have less interest, lower enrollment rates and less positive perceptions of the food and fiber industry (Mallory & Sommer, 1986; Talbert & Larke, 1995; Roberts, et. al., 2006). In reviewing literature that supports the suggestion that minority students hold more negative views of agriculture, the time frame in which the data was collected must be considered, as generational differences in perception become apparent.

Wiley, et. al. (1997) conducted a week long pre-college workshop specifically for minority students acting on the assumption that more knowledge of the food and fiber industry would lead to increased positive perceptions and behaviors. Minority students began the workshop in agreement that they had little knowledge of the agricultural industry. The post-test and delayed post-test showed that their knowledge and perceptions became stronger, as well as sustained one year later. The participants in workshop consistently held more positive perceptions and increased knowledge of agriculture than the control group. Upon the conclusion of the study, Wiley et.al., recommended that pre-college workshops for minority students could impact recruitment efforts and provide minority students with more knowledge of agriculture (Wiley, et.al., 1997).

Fraze, et.al. (2009) supported the findings by Wiley, et. al., in suggesting that college agriculture programs hold pre-enrollment workshops for minority students to increase agricultural knowledge and perceptions to support recruitment of diverse students. Once exposed to agricultural knowledge, they may experience increased positive perceptions of the agriculture industry and the prospect of an agricultural career. Urban Hispanic students may benefit from an intensive agricultural literacy and communications workshop, regardless of their enrollment in a secondary level agriculture program. Hispanic and African-American students in urban regions of Texas were given a pre-test followed by modules of agricultural instruction. A post-test was administered to determine their perceptions of the agricultural industry and desire to pursue agriculture further. The results showed that minority students completed the workshop with slightly more positive perceptions of agriculture and an increased knowledge of agricultural careers (Fraze, et. al., 2009).

Enrollment in post-secondary agriculture programs has dwindled, leading to a lack of qualified individuals to fulfill career opportunities in agriculture, particularly by ethnic minorities (Mallory & Sommer, 1986, p.4). Jones & Larke (2001), aimed to determine the factors that influence minority college graduates' career decisions. All of the participants were Texas A&M graduates. The participants reported that support from ethnic minority mentors to pursue an agricultural career positively influenced their decision making process, although the mentors had varied professional backgrounds. Graduates also considered an agricultural career when their father worked in agriculture. Early exposure to agriculture appeared to play a minimal role in influencing students' career choice (Jones & Larke, 2001).

Wildman and Torres (2001) investigated the main factors that influence students, particularly focusing on exposure to agriculture, family and friends, college of agriculture recruitment activities, professionals and finally job considerations. The students responded that prior experience in agriculture was the most influential factor, as they selected their major in agriculture. In addition, relatives with agricultural experiences and participation in FFA or 4-H programs were positive influences. The atmosphere of the collegiate agriculture department and the friendliness of professors were reported to have an effect on students' major choice (Wildman & Torres, 2001).

Some Hispanic students in Washington state perceived higher education as less attainable due to barriers related to the belief that agriculture provides low paying, manual labor intensive jobs, financial stress, as well as family or cultural factors. Hispanic students that were less acculturated, experienced more difficulty in pursuing higher education and held more negative views of agriculture (Nichols, Jimmerson & Nelson, 1993). In contrast, Mullinix, et.al., (2006) found that Latinos in north central Washinton actually held positive views of agriculture, valued their own hard work, and expressed an interest in encouraging their children to pursue agricultural careers with proper educational support (Mullinix, et.al., 2006).

Betchtold and Hoover (1997) also found that Hispanic students in Florida were more likely to hold negative perceptions of the food and fiber industry, consistent with previous literature (Whent, 1994, p.9), associating agriculture as a career or degree path with little room for advancement. Additionally, Hispanic students reported feeling more unprepared academically for higher education, perceiving little support from secondary educators as well as their family. Lack of knowledge about the college application process, financial aid information, and available careers related to higher education, were also stated as barriers to Hispanic enrollment. The study recommended that agricultural colleges employ more diverse faculty and educators, increase minority recruitment at the middle school level, as well as provide workshops regarding scholarships, financial aid and campus employment in English and Spanish (Betchtold & Hoover, 1997).

Vincent, Henry & Anderson (2012) illustrated the lack of diversity among agricultural educators at the secondary and post-secondary level. As of 2005, around 2.4% of pre-service agricultural educators were Hispanic. The available literature produces conflicting views as to whether or not racial and ethnic representation of educators impacts the enrollment of minority students in higher education agriculture programs. However, it becomes apparent that some Hispanic students hold an appreciation for agricultural educators and mentors that are relatable on a cultural level (Salomon & Vargas, 2014). Ultimately, Vincent, Henry & Anderson (2012), explore the motivating factors that influence college major choice of minority students. Participants reported internal motivation for becoming agricultural educators, such as a passion for learning and teaching, as well as being provided with helpful information about opportunities in the field. Agricultural education as a college major choice became more of a viable choice as their perception and understanding of the industry changed. External motivation appeared to tangibly manifest as participants recognized the opportunity for career advancement though agricultural education, giving back to one's community, and contributing to the increased diversity in the profession (Vincent, Henry & Anderson, 2012).

Purpose

Sul Ross State University is a Hispanic Serving Institution, however, the college of agriculture enrolls approximately 20% Hispanic students, which is far below the university percentage of Hispanic students; this is a trend Estep and Stripling (2015) found to be commonplace in many universities. Additionally, Doerfert (2011) recommended research be conducted concerning diversity within the context of agricultural education. Because prior agricultural experiences and embedded biases play a role in the decision making process of students, the purpose of this qualitative study was to examine the prior experiences of Hispanic students enrolled in the agriculture and natural resource college. The following research objectives directed the study:

Determine Hispanic students' perceptions of experiences leading them to pursue a degree in agriculture, and Determine Hispanic students' perceptions of experiences motivating them to remain in an agricultural degree program.

Methods

The population for this qualitative study was Hispanic students enrolled in an agricultural major at Sul Ross State University. Snowball sampling was used to select participants from the population (McMillan & Schumacher, 2010). We identified initial participants and encouraged them to invite colleagues to participate in focus groups. The final sample consisted of 11 Hispanic students, four male and seven female, currently enrolled in agricultural degree programs. All participants were assigned pseudonyms for the purposes of anonymity. The following students participated in the study: Marcos, a senior Animal Science student; Leonardo, a Natural Resource Management student; Christian, a junior in Animal Science; Daniel, a PhD Natural Resource Management student; Annabelle, a transfer student in Natural Resource Management; Mia, a graduate student studying Animal Science; Sara, a junior studying Natural Resource Management; Maria, a junior Animal Science student; Sofia, a senior studying Natural Resource Management; Elena, a senior in the Animal Science department; and Rafaella, a senior in Animal Science.

Data were collected via focus groups, which were deemed appropriate due to the purpose of the study (Flick, 2006). Use of focus groups allowed Hispanic students' to interact and share their experiences in an open setting. According to Morgan (1988), focus groups have the added benefit of interaction between participants, often producing more insights that would not be as easy to access from a singular interview. We utilized open-ended questions during the focus groups to encourage participation, and focus groups were held over the course of three days to allow for the maximum amount of students to attend. Each focus group lasted approximately one hour. All focus groups were recorded and transcribed verbatim. The constant comparative method was used to analyze and identify common themes in the data (Glaser & Strauss, 1967).

Dooley (2007) outlined trustworthiness criteria for qualitative studies, including credibility, transferability, dependability and confirmability. We established credibility through triangulation of the data between researchers and the field notes. Transferability in this study was not an issue, as the purpose of the study was not to generalize to broader audiences, but, to provide a rich description of the participant's experiences. We ensured dependability by thorough documentation and field notes taken during the focus groups, while confirmability was established by allowing participants access to the transcripts from their focus group session (Dooley, 2007).

Qualitative research typically contains a subjectivity statement from the researchers to highlight any biases. The first researcher is a senior agricultural education student and McNair research scholar. She is from a bi-racial family and understands the complexity of racial identity. Her approach to this project was to create an open forum for students to discuss the issues of diversity within an agricultural education context. The second research is an assistant professor in agricultural education. He adheres to the epistemological stance of social constructivism. He believes knowledge is constructed from past experiences and through a social context. Both researchers value the importance of others' experiences, especially when tackling the issue of how to successfully create a diverse agriculture program.

Results

Initial Exposure to Agriculture

Participants were divided on their exposure to agriculture. They either had extensive agricultural experience or

they did not discover agriculture until enrolling in their first agriculture courses in college. Interestingly, while many had grown up around agriculture, they did not have experience with secondary agricultural education. Christian's family was very connected to agriculture, however, he was disappointed his high school did not have an agriculture program because he would have enjoyed getting an earlier start in agricultural studies. Daniel, who had much agricultural experience, expressed that he decided early on he was going to study agriculture in college because it was the most appealing option. Raffaella's experience mimicked Daniel's closely. Her decision to major in animal science was deeply rooted in a desire to care for animals. She explained that her family was used to bringing animals to her for minor medical attention and felt instinctively drawn to animal science.

While some participants had extensive agricultural backgrounds, others began college majoring in other subjects switching to agriculture later because they found the degree program to be more fulfilling. Sara completed a degree in mortuary science and initially worked in her father's funeral home. She said, "I got really bored of working in an office every day and dressing up" (F.G. #1). Once in the wildlife program, she was able to enjoy the outdoor aspects of pursuing a natural resource management degree. Sofia had no previous exposure to agriculture, but was drawn from a young age, specifically because of the ability to work with wildlife and gain hands-on experience. Likewise, Mia originated from urban California and had no previous agricultural experience; she found the animal science program once enrolled at Fresno State University. Mia said that originally, she didn't truly know where her food came from, but once she was exposed to agriculture,

I saw this huge agriculture industry and...just fell in love with it...Going to Fresno, and actually realizing what these farmers are producing for America is awesome, that I got to see the transition from a farm to a plate. And that got me more involved in all the different clubs in the agriculture industry and all that good stuff. That's why I ended up falling in love with it, because all the opportunity to help feed America, I guess (F.G. 1).

Marcos began college with the intention of becoming an engineer and had a similar experience to Leonardo, switching to animal science in his junior year. Marcos realized that he enjoyed being around livestock and horses and decided to minor in equine science. Anabelle shared that she was also on a business track to become an accountant, but found that she preferred the challenge and outdoor experiences associated with a natural resource management degree.

Another shared experience among participants established that an agricultural degree would lead to job satisfaction. Many students articulated their continued interest in the hands-on aspect of an agricultural degree. Their mutual exposure to agriculture while in college left them with the overall impression that they would find success in an agricultural career due to doing what they love, without a strong focus on monetary gains. Most of the participants reiterated that their interest of agriculture "isn't about the money" or "you just have to be born with it [the love of agriculture]". The perseverance that they have demonstrated while acquiring their degrees is not tied to the prospect of a large paycheck at the end of the experience.

Family Expectations

Several participants were met with resistance from their families when they disclosed their decision to pursue an agricultural degree. However, each participant displayed perseverance by continuing their degree, even without the direct support of close family members. Interestingly, some parents had negative perceptions of agriculture, even though many of the dissenting parents had a background in agriculture. A few participants mentioned their families asked if they were smart enough to be a people doctor, why would they become an animal doctor. In fact, Sara's family felt like an agricultural degree was "going backwards". She stated,

They [family] feel like I should be (and I think a lot of families, Hispanic families feel this way) like they should be going for becoming doctors or lawyers or whatever. They kind of like, see, like being outdoors as a

negative thing (F.G. 1).

Additionally, Mia's parents didn't view meat science as a degree leading to a viable career. Mia shared her frustration over having to communicate the relevance of her degree,

When I went to Fresno, I was pre-vet, when I changed my major to meat science, which is what I'm doing now, they like thought I was regressing as well... I had to explain to them that meat science is its own industry and you can be successful there too, but to this day, not trying to get personal or anything, but they still tell their friends that I'm going to school like to be a vet, even though I'm in meat science (F.G. 1).

Similarly, both Marcos and Leonardo had to convince their fathers (who had backgrounds in agriculture) that they could be successful in agriculture.

In contrast, Rafaella, Sofia, Anabelle, and Christian all experienced positive support from their immediate families, who were not surprised about participants' pursuit of agricultural degrees. Rafaella's family's reaction to her degree choice was "it's about time" (F.G. 1). However, while Anabelle's mother and father fully supported her choice to pursue agriculture, her extended family revealed mixed feelings. Her extended family expected her to pursue more traditional female gender roles,

When it comes to my grandma and my aunts and all the rest of my family, which live in Mexico, they were kind of against me like going to vet school, just because I am a girl, and how am I going to be handling like big animals and stuff like that, so it was kinda hard for them, but they knew that I always wanted to be working with animals (F.G. 2).

Program Atmosphere and Opportunities

Participants mentioned one factor keeping them in a college of agriculture was the program atmosphere and opportunities. Most participants agreed that agricultural professors take time to get to know their students. Faculty members seem invested in their students, and in return, the students notice and appreciate the rapport that has been established. Rafaella described how she felt about the agricultural program atmosphere by saying, "Hispanic families...like to get together. We want to be around everybody. You know, it's like a big Bar-B-Que." Mia shared that she was specifically looking for a friendly department when choosing universities,

Back at my old school, I had that friendly environment, and so when I was looking for a grad school, that's what I was looking for ... So, talking to the professors here in the animal science department, I felt that unity...You know every professor, and they know you (F.G. 1).

Daniel noted professors in the college of agriculture are generally accessible and approachable. He said, "It's easy to go to their office and easy to send an email and just ask a simple question" (F.G. 1).

Anabelle shared that one factor influencing her to choose agriculture at Sul Ross State University was the availability of opportunities to be involved with faculty research projects at the undergraduate level. In choosing a small agriculture program, she explained that:

I was...going to be competing with a lot of people. I also felt like I was competing with a lot of machismo there [at another college]. I would rather go to a small place...where it's still like new opportunities where you can still be doing something new... I don't think they get the great opportunities that we are having (F.G. 2).

Discussion

Based on the research objectives that guided the study, the following conclusions were drawn. First, participants either grew up with an agricultural background or unexpectedly discovered agriculture while in college. Most students with an agricultural background did not receive formal agricultural education through a secondary agricultural education program, rather, they gained experience through observation and participation on their families' farms and ranches. Second, most participants had family members who were opposed to their pursuit of agriculture. While some participants had immediate family members who supported their degree choices, most extended family members were opposed. Lastly, most participants agreed that the atmosphere of the agricultural program and the opportunities available were factors keeping them enrolled in an agricultural degree program.

Talbert and Larke (1995) concluded that minority students would not pursue an agricultural degree if they perceived career opportunities in agriculture as production based. Additionally, Mullinix et al. (2006) stated that "popular media commonly reinforces the notion that Latinos generally dislike working in agriculture, do so because of lack of alternate opportunity and would prefer employment in other sectors" (p.2). However, the Hispanic students in this study expressed a clear knowledge of the career opportunities available to them during college and upon graduation. Even while participants met with family resistance and mentioned that their families associated an agricultural career with farm labor or difficult outdoor work, participants' positive view of agriculture did not change. They acknowledged the presence of difficult work and accepted it as a component of doing what they love and not a deterrent. One plausible explanation to the difference between participants' and familial perceptions of agricultural careers could be the literature citing negative perceptions of agriculture among minority students is quite dated and perhaps newer generations of minority students have differing perceptions.

Within the theme of family expectation, several interesting observations emerged. Several participants had trouble gaining immediate support from their close family members. Other students however, had full family support and were able to complete their degree without the added stress of justifying their degree choice to their family. The literature showed that students are more likely to pursue a degree or career in agriculture when their father held a job in an agriculturally related field and less likely to pursue a career if their father held a job outside of agriculture (Jones & Larke, 2001). Participants' experiences were congruent with these findings, although interestingly, the fathers with agricultural experience were more hesitant to support their children's decisions. Participants with fathers who worked in agriculture chose to pursue agriculture, however, they did not receive immediate support for their decision. This finding was interesting, as the fathers tried to convince their children to pursue a more professional career such as engineering or medicine. However, these participants exhibited strong resolve to pursue their degrees, despite objections from immediate family. It may be possible that these parents do not view agriculture as a professional career track. Further studies should these perceptions among parents.

Participants unanimously agreed that their experiences in the college of agriculture were positive and inclusive, and contributed to them staying enrolled in an agricultural program. Furthermore, they indicated that their agriculture professors were approachable and accessible. This is congruent with research by Estep and Roberts (2013), who found a positive link between professor-student rapport and student motivation. The positive experiences of these Hispanic students could be linked to high levels of professor immediacy, marked by the accessibility and approachability of professors in the college. The positive experiences of participants reflected a level of increased participation in the agricultural program, in part due to the positive relationships formed with their professors. The findings of Wildman and Torres (2001) illustrated that students consider the friendliness of professors as well as the atmosphere of the college when selecting a major in agriculture. Students in this study pointed to these factors as influencing their decision-making process of college and major choice, particularly students who transferred from larger institutions.

Recommendations

Whereas the cultural climate of the nation continues to shift, it is imperative to ask agricultural educators to consider diversity a top priority. As illustrated in the literature, recruiting diverse individuals is critical to the vitality of the agricultural industry and to fill jobs with highly qualified staff. The literature reflects mixed messages about agricultural perceptions among minority students. While older literature shows negative perceptions of the agricultural industry among minority students, newer literature paints a different picture. Thus, agricultural educators need to be informed with the latest information in order to make informed decisions concerning diversity in their programs. Consequently, newer studies examining the perceptions of minority students concerning agriculture should be conducted. Additionally, recruitment messages should be created geared toward minority students that address specific perceptions about agriculture.

Some participants in this study serendipitously found agriculture and once enrolled in an agricultural degree program expressed a newfound appreciation for the discipline of agriculture. However, this may not be the case for many minority students. Therefore, it is recommended that students, particularly minorities, be introduced to agricultural education at a younger age, during elementary school for example. Currently, few curricular programs exist to inculcate students into agriculture at this early of an age. The implementation of early agricultural experiences and exposure to agriculture could create a positive impact early in students' academic careers. Additionally, secondary agricultural education programs must ramp up recruiting efforts, particularly toward minority students. Lastly, as suggested by Frazee et al. (2009), the use of pre-college workshops could influence students' decision to major in agriculture and possibly help create more positive perceptions among students.

Furthermore, the literature suggested that secondary agricultural educators may not be implementing teaching strategies that create an inclusive environment for diverse students (Luft, 2009). Embedding culturally responsive teaching strategies and cultural inclusion activities throughout preservice teacher education programs could help prepare preservice teachers for navigating a diverse classroom. Additionally, inservice agriculture teachers should be informed of the benefits of cultural diversity and how to nurture cultural diversity within their programs.

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Personality and Goal Orientation of Undergraduate Agricultural Leadership Students: An Empirical Analysis

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Abstract

Finding strategies to increase the motivation of students, and in turn their connection with the material and retention of the content, has been of paramount importance within agricultural education. However, within an undergraduate agricultural leadership education context few empirical studies have examined the motivational dispositions of this population, along with the antecedents and predictors of such inclinations. To address the present gap an analysis of the Big Five personality factors, goal orientation disposition, and the relationship between personality and goal orientation was conducted. A descriptive correlational research design using a census approach in four undergraduate agricultural leadership classes yielded 177 responses. Results indicated that respondents were generally extraverted, emotionally stable, agreeable, conscientious, and open to experiences. Furthermore, students were learning goal oriented indicating a motivational pre-disposition towards content mastery. However, students also indicated a high level of preference for performance goal orientation where they were able to prove their competence or knowledge of the subject matter. Results also indicated that between 15% and 28% of the variance in goal orientation dispositions was predicted by personality factors, confirming the predictive nature of the relationship. Based on the observed results agricultural educators or recommended to include personality and goal orientation discussions into their leadership curriculum and to create a learning environment that accommodates all learners.

Introduction

According to Hofer (2011) “few topics concern teachers at all levels as much as the motivation of students” (p. 140). Finding strategies to increase the motivation of students and in turn their connection with the material and retention of the content has been of paramount importance within agricultural education (e.g. Buckmaster & Carroll, 2009; Lamm, Carter, & Melendez, 2014a). However, within an undergraduate agricultural leadership education context few empirical studies have examined the motivational dispositions of this population, along with the antecedents and predictors of such inclinations (Lamm et al., 2014a).

From a leadership development perspective an emergent theme in the literature has been the psychodynamic approach, or an acknowledgement that personality underlies many of the outward manifestations that are perceived as behavior (Stech, 2013). Specifically, personality represents “a consistent pattern of ways of thinking, feeling, and acting with regard to the environment, including other people” (Stech, 2013, p. 319). Consequently, personality has been established as one of the most widely recognized predictors of behavior within organizations and educational environments (Bass, 2008).

However, despite the acknowledgement of personality as relevant factor to consider when engaging in leadership development (Northouse, 2013), little empirical research has been conducted to link this persistent set of traits to undergraduate student outcomes, particularly motivation (Lamm, Carter, Stedman, Lamm, 2014b). One possible explanation for the lack of research within this area is the large array of personality traits and measures available in the literature base, “there are thousands of personality measures in the published literature” (Hogan & Roberts, 2001, p. 6). . Accordingly, the abundance of choice may represent an impediment to establishing an accessible framework to properly study learner motivation through a personality lens (Iyengar & Lepper, 2000).

Another limitation of past studies has been considering personality traits as individual entities and thus measuring and treating personality variables as individual factors (Lamm et al, 2014b). Human behavior represents a dynamic environment where multiple personality factors are interacting in a dynamic system constantly interacting with the external environment (Hampson, 2012). Focusing on single traits, particularly in a dynamic classroom educational environment, may limit the utility of findings, especially from a motivational perspective (Barrick, Mount, & Judge, 2001). However, a more comprehensive analysis of personality characteristics within the a population of undergraduate agricultural leadership students may provide valuable audience insights as well as the ability to leverage those insights to help inform motivational strategies, specifically, addressing the need for future research “studying the antecedents of intrinsic motivation [in undergraduate agricultural leadership students]” (Lamm et al., 2014a, p. 112) within the literature.

Although the literature contains numerous articles describing the motivation of students (e.g. Aarnio, Nieminen, Pyörälä, & Lindblom-Ylänne, 2010; Kember, Ho, & Hong, 2008; Turner & Herren, 1997), these studies have tended to focus on broad recommendations rather than acknowledging the nuance and personal nature of motivation at the learner level. Research focused on a proximal set of variables, such as personality, and linking these variable to individual learner motivation dispositions may provide valuable insights to an educator (Hofer 2011; Stech, 2013).

Previous research linking student motivational dispositions, or goal orientation, to personality has indicated a likely relationship. For example, past studies have shown personality antecedents have been shown to predict motivational tendencies in organizational settings (Payne, Youngcourt, & Beaubien, 2007). Additionally, Steinmayer, Bipp and Spinath (2011) found that goal orientation, in combination with personality, was a predictor of academic achievement in a sample of 11th and 12th graders beyond the predictive capacity of intelligence alone. However, there remains a gap in the literature focused on agricultural leadership education specifically examining the personality and goal orientation dispositions of this population of learners.

Priority area four of the National Research Agenda: American Association for Agricultural Education 2011 – 2015 (Doerfert, 2011) addresses the need for meaningful, engaged learning with a specific need to “examine the role of motivation, self-regulation, metacognition, and/or reflection in developing meaningful, engaged learning experiences across all agricultural education contexts” (p. 9). This research was conducted to provide insights regarding the contextual and individual differences in motivational disposition of undergraduate students within an agricultural leadership education setting.

Theoretical Framework

The theoretical framework for the study is based on the Five Factor Model (FFM) of personality (Norman, 1963) and the conceptualization of goal orientation proposed by Vandewalle (1997).

The Five-Factor Model of Personality

The five-factor model serves as a consensual organization of traits. The purpose behind the model has been to create a structured set of personality factors to be utilized as an organized inventory of the more than 15,000 personality-trait adjectives in the English language (Goldberg, 1990). Although alternative models of personality exist (Block, 1995; Eysenck, 1992), the Big Five personality traits model proposed by Costa and McCrae (1992) has been shown to be reliable and appropriate for analysis based on an extensive use within the literature (e.g. Judge, Simon, Hurst, & Kelley, 2014).

The personality factors of openness, conscientiousness, extraversion, agreeableness, and neuroticism comprise the Big Five model (Costa & McCrae, 1985; Costa & McCrae, 1992). Openness has been described as “imaginative, cultured, curious, original, broad-minded, intelligent, and artistically sensitive (Barrick & Mount, 1991, p. 5). Conscientiousness has been described by an orientation towards dependability, organization, and responsibility (Costa & McCrae, 1992). Extraversion, or surgency, has been associated with traits such as

“being sociable, gregarious, assertive, talkative, and active” (Barrick & Mount, 1991, p. 3). Agreeableness has been defined by “being courteous, flexible, trusting, good-natured, cooperative, forgiving, soft-hearted, and tolerant” (Barrick & Mount, 1991, p. 4). The final factor, neuroticism or conversely emotional stability, has been conceived to include “being anxious, depressed, angry, embarrassed, emotional, worried, and insecure” (Barrick & Mount, 1991, p. 4).

Goal Orientation

Goal orientation has been demonstrated to be important because it has provided a mental framework to interpret situations and respond to those situations (Dweck, 1991). Dweck (1986) and later Dweck and Legget (1998) theorized that people have goal orientation differences according to their personality traits. Goal orientation has been conceptualized as tending to occur within two domains, in particular, either learning goal orientation or performance goal orientation. Individuals with learning goal orientation have tended to view their ability as malleable. They hold goals to further develop their ability rather than a desire to demonstrate their current level of ability (Vandewalle, 1997). Conversely, individuals holding performance goal orientation view their ability as fixed and difficult to develop. Consequently goals are set to validate their static abilities (Vandewalle, 1997).

Vandewalle (1997) extended upon the work of Dweck (1986) and suggested goal orientation might be further conceptualized as a three-factor construct. In particular performance goal orientation was partitioned into two distinct dimensions, either performance goal avoid (avoiding negative judgments) or performance goal prove (gaining positive judgments) (Vandewalle, 1997). The multi-dimensional nature of performance goal orientation was derived from the human response to desire to gain positive judgment and avoid negative judgments of one’s ability (Heyman & Dweck, 1992).

Goal orientation has represented a likely channel through which to understand learner motivational dispositions (Hofer, 2011), in particular, the use of either mastery or performance goals or motives (Ames, 1992). Accordingly, “students who adopt mastery goals are those whose primary desire is to understand and master the material. By contrast, students with performance goals are more likely to focus on their achievement relative to the performance others” (Hofer, 2011, p. 144). From this perspective learners that have a mastery orientation might be considered to be more learning goal orientated (LGO) stemming from one’s desire to acquire new skills, master new situations, and improve competence in order to develop the self (Vandewalle, 1997). Alternatively, performance goals might be categorized as either performance prove goal orientation (PGOP) motivated by one’s desire to prove ability in order to gain positive judgments (Vandewalle, 1997), or performance avoid goal orientation (PGOA) motivated by one’s desire to avoid negative judgments on their ability and disproving of their competence (Vandewalle, 1997).

Personality Predicting Goal Orientation

Previous research has established the relationship between personality and goal orientation. For example, Culbertson, Leiva, Henning, and Post-Piller (2009) examined the relationship between personality, goal orientation, and job preferences. The results indicated both personality and goal orientation were relevant considerations in a model seeking to represent job preference in undergraduate students. Additionally, LGO had a statistically significant relationship with conscientiousness, agreeableness, and extraversion; PGOP had a statistically significant negative relationship with emotional stability; and PGOA had a statistically significant negative relationship with agreeableness, extraversion, emotional stability, and openness.

Although the personality and goal orientation results observed by Culbertson et al. (2009) were statistically significant the findings were inconsistent with previous research. For example, Bipp, Steinmayr, and Spinath, (2008) examined the relationship between personality, goal orientation, and intelligence within a sample of university students. Bipp et al. (2008) found statistically significant relationships between personality and goal orientation. However, unlike Culbertson et al. (2009) LGO had statistically significant relationships with extraversion, openness, and agreeableness while PGOA had statistically significant negative relationships with

emotional stability and extraversion. Within both studies PGOP had a statistically significant negative relationship with emotional stability.

In their meta-analysis of goal orientation studies Payne et al. (2007) conceptualized personality as an antecedent for goal orientation disposition consistent with the suggestions of Dweck (1986) and Dweck and Legget (1998). In particular, goal orientation dispositions may represent compound traits composed of multiple personality factors (Hough & Schneider, 1996). Illuminating the nature of the relationship from a comprehensive personality perspective may therefore provide incremental validity beyond the bi-variate correlations found previously thus providing educators greater insight regarding the best way to motivate learners based on a combination of personality and goal orientation considerations (Payne et al., 2007).

Purpose & Research Questions

The purpose of this study was to examine how undergraduate agricultural leadership students' personality predicted their goal orientation. The study was driven by the following research objectives:

1. Describe the personality characteristics of undergraduate agricultural leadership students using the five-factor model of personality.
2. Describe the goal orientation characteristics of undergraduate agricultural leadership students.
3. Identify the relationship between personality and goal orientation in undergraduate agricultural leadership students.
4. Identify how personality predicts goal orientation in undergraduate agricultural leadership students.

Methods

The population for this study was undergraduate agricultural leadership students. A descriptive and correlational research design was employed to address the research objectives. A census of four classes of undergraduate agricultural leadership students from two agricultural leadership courses in a single southern land grant university was included in the study. The first course was an upper level offering directed at group and team leadership. Data from course one were collected in the spring of 2013 ($n = 32$), the spring of 2014 ($n = 44$), and the spring of 2015 ($n = 40$). The second course was an upper level course directed at personal leadership development. Data from the second course were collected in the spring of 2013 ($n = 61$). Multiple classes were studied to increase generalizability of results (Ary, Jacobs, & Sorensen, 2010). A total of 177 responses were obtained and represented a 97% response rate. Respondents received no compensation or course credit for participating in the study.

Demographic data were obtained through respondent self-report. The sample was 34.5% ($n = 61$) male and 63.8% ($n = 113$) female. Respondents represented all undergraduate classifications within the university, 3.4% ($n = 6$) freshman, 12.4% ($n = 22$) sophomore, 37.3% ($n = 66$) junior, 45.2% ($n = 80$) senior, with one individual indicating they were a graduate student.

Participant race and ethnicity were defined as self-perceived membership in population groups that define themselves by cultural heritage, language, physical appearance, behavior, or other characteristics ("Standards", 1995, p. 26). In this study, race was defined as: American Indian or Alaska native; Asian or Pacific Islander; Black or African American; White; or Other. Ethnicity was defined as either Hispanic/Latino(a)/Chicano(a) or not. These categories were based on United States of America Office of Management and Budget standards for the classification of Federal Data on Race and Ethnicity ("Standards", 1995, p. 29). From an ethnicity perspective 10.7% ($n = 19$) of respondents identified themselves as Hispanic/Latino(a)/Chicano(a). In regard to respondents' race, 80.8% ($n = 143$) identified themselves as White, 8.5% ($n = 15$) identified themselves as Black or African American, 7.9% ($n = 14$) identified themselves as Asian or Pacific Islander, 0.6% ($n = 1$)

identified themselves as American Indian or Alaska native. Additionally, seven individuals identified themselves within an ‘Other’ category.

A paper-based questionnaire composed of previously developed, valid and reliable instruments was used to collect participant responses. Using previously established measures has been shown to increase observed data validity and reliability (Ary et al., 2010). The questionnaire was reviewed by a panel of experts knowledgeable in survey design, personality, and undergraduate instruction for face and content validity prior to administration.

Respondent personality was measured using the IPIP-NEO, specifically the version developed by Johnson (2011). Individuals responded to 44 personality statements indicating their response on a five-point, Likert-type scale. Possible responses to each item included: 1 – *Strongly Disagree*, 2 – *Disagree*, 3 – *Neutral*, 4 – *Agree*, 5 – *Strongly Agree*. The measure was based on the International Personality Item Pool (IPIP) established by Goldberg et al. (2006). The measure was selected based on reliability characteristics with coefficient alpha values greater than .70 previously observed for each facet construct (Johnson, 2011). Based on established social science research standards, a Cronbach’s α of .70 or greater is considered sufficient (Cortina, 1993; Schmitt, 1996; Streiner, 2003). Specifically, the emotional stability index was found to have a Cronbach’s α of .78, the conscientiousness index was found to have a Cronbach’s α of .71, the agreeableness index was found to have a Cronbach’s α of .83, the extraversion index was found to have a Cronbach’s α of .84, and the openness index was found to have a Cronbach’s α of .70.

Respondent goal orientation was measured using the work domain goal orientation instrument developed by Vandewalle (1997). Individuals responded to 13 goal orientation statements indicating their response on a five-point, Likert-type scale. Possible responses to each item included: 1 – *Strongly Disagree*, 2 – *Disagree*, 3 – *Neutral*, 4 – *Agree*, 5 – *Strongly Agree*. The learning goal orientation index was found to have a Cronbach’s α of .82, the performance goal orientation prove index was found to have a Cronbach’s α of .81, and the performance goal orientation avoid index was found to have a Cronbach’s α of .84.

Results were analyzed using SPSS version 22. Descriptive statistics were calculated to determine the personality and goal orientation preferences of respondents. Pearson product-moment correlations were calculated to examine the relationship between variables and simultaneous multiple regression was calculated to examine the predictive capacity between variables (Ary et al., 2010). Thresholds for statistical significant had an *a priori* alpha level set at .05.

Results

Personality

Respondent personality scores were calculated using the IPIP-NEO scoring key. IPIP-NEO agreeableness scale scores are based on a one to five scale. Respondents had the highest mean score in agreeableness ($M = 3.86$, $SD = .39$) and the lowest mean score in extraversion ($M = 3.59$, $SD = .72$). The mean, standard deviation, minimum, and maximum scores for each personality factor (emotional stability, conscientiousness, agreeableness, extraversion, and openness) are presented in Table 1.

Table 1
Personality Scale Scores

Personality Scale Scores	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Emotional Stability	171	3.74	0.68	1.40	5.00
Conscientiousness	174	3.74	0.61	2.00	5.00

Agreeableness	164	3.86	0.39	2.50	4.63
Extraversion	175	3.59	0.72	1.20	5.00
Openness	173	3.80	0.60	2.20	5.00

Goal Orientation

Respondent goal orientation scores were calculated using the Vandeville (1997) work domain goal orientation instrument scoring key. Goal orientation scale scores are based on a one to five scale. Respondents had the highest mean score in learning goal orientation ($M = 3.99$, $SD = .56$) and the lowest mean score in performance goal avoid orientation ($M = 2.65$, $SD = .78$). The mean, standard deviation, minimum, and maximum scores for each goal orientation index are presented in Table 2.

Table 2
Goal Orientation Scale Scores

Goal Orientation Scale Scores	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Learning Goal Orientation	175	3.99	0.56	2.60	5.00
Performance Goal Orientation – Prove	174	3.70	0.74	1.50	5.00
Performance Goal Orientation – Avoid	173	2.65	0.78	1.00	4.75

Relationships between Personality and Goal Orientation

Pearson product-moment correlations between personality and goal orientation were completed to investigate the nature of the relationship between variables (Ary et al., 2010). Correlation coefficients and statistical significance between variables are provided in Table 3. Correlations ranged from negligible to moderate in magnitude (Davis, 1971). Learning goal orientation had a statistically significant relationship with all personality factors, with the exception of agreeableness. Performance goal prove orientation had statistically significant negative relationship with agreeableness and a statistically significant positive relationship with extraversion. Finally, performance goal avoid orientation had statistically significant negative relationships with all personality factors with the exception of conscientiousness.

Table 3
Intercorrelations between Personality and Goal Orientation

	1	2	3	4	5	6	7	8
1. Emotional Stability	-							
2. Conscientiousness	.22**	-						
3. Agreeableness	.28**	.36**	-					
4. Extraversion	.42**	.15	.13	-				
5. Openness	.11	.15*	.17*	.36**	-			
6. Learning Goal Orientation	.26**	.32**	.10	.24**	.41**	-		
7. Performance Goal Orientation - Prove	.05	.08	-.26**	.32**	.06	.25**	-	
8. Performance Goal Orientation - Avoid	-.21**	-.07	-.22**	-.30**	-.26**	-.27**	.23**	-

* $p < .05$, ** $p < .01$

Personality Predicting Goal Orientation

Multiple regression analysis was completed to determine whether a predictive relationship existed between the five personality factors and each of the three goal orientations. Goal orientation was treated as a dependent variable. The five personality factors were treated as the independent variables of interest.

Unstandardized regression coefficients in the form of variable level effects along with statistical significance for the learning goal orientation model are provided in Table 4. According to the analysis 28% of the variance in learning goal orientation is explained by the five factors of personality, and this explained variance is statistically significantly different from 0 because the omnibus model is statistically significant ($R^2 = .28$, $F(5, 153) = 8.52$, $p < .000$). The personality factors of emotional stability, conscientiousness, and openness were found to be statistically significant predictors when controlling for all five personality factors.

Table 4
Predicted Impact of Personality Factors on Learning Goal Orientation

	<i>b</i>	<i>p</i>
Constant	1.67	.000***
Emotional Stability	0.20	.003**
Conscientiousness	0.23	.002**
Agreeableness	-0.15	.182
Extraversion	-0.03	.684
Openness	0.37	.000***

Note. *** $p < .001$, ** $p < .01$, $R^2 = .28$

Unstandardized regression coefficients in the form of variable level effects along with statistical significance for the performance goal-prove orientation model are provided in Table 5. According to the analysis 20% of the variance in learning goal orientation is explained by the five factors of personality, and this explained variance is statistically significantly different from 0 because the omnibus model is statistically significant ($R^2 = .20$, $F(5, 152) = 7.65$, $p < .000$). The personality factors of conscientiousness and extraversion were found to be statistically significant positive predictors and agreeableness was found to be a statistically significant negative predictor when controlling for all five personality factors.

Table 5
Predicted Impact of Personality Factors on Performance Goal – Prove Orientation

	<i>b</i>	<i>p</i>
Constant	4.38	.000***
Emotional Stability	-0.05	.529
Conscientiousness	0.24	.014*
Agreeableness	-0.66	.000***
Extraversion	0.35	.000***
Openness	-0.02	.858

Note. *** $p < .001$, * $p < .05$, $R^2 = .20$

Unstandardized regression coefficients in the form of variable level effects along with statistical significance for the performance goal-avoid orientation model are provided in Table 6. According to the analysis 15% of the variance in learning goal orientation is explained by the five factors of personality, and this explained variance is statistically significantly different from 0 because the omnibus model is statistically significant ($R^2 = .15$, $F(5, 152) = 5.37$, $p < .000$). The personality factors of agreeableness, extraversion, and openness were found to be statistically significant negative predictors when controlling for all five personality factors.

Table 6

Predicted Impact of Personality Factors on Performance Goal – Avoid Orientation

	<i>b</i>	<i>p</i>
Constant	5.53	.000***
Emotional Stability	-0.03	.772
Conscientiousness	0.10	.370
Agreeableness	-0.37	.024*
Extraversion	-0.20	.043*
Openness	-0.26	.022*

Note. * $p < .05$, $R^2 = .15$

Conclusions, Implications, and Recommendations

The results associated with this study are noteworthy for their contribution to both agricultural education theory and practice. From a practical perspective a number of quantitative benchmarks have been established that may help to provide undergraduate leadership student profile insights to educators based on the research sample within the broader population. Additionally, an ancillary benefit of the research included the validation of rigorous, free, and easily administered instruments available to gather undergraduate agricultural leadership student personality and goal orientation disposition data.

Overall, the sample of undergraduate agricultural leadership students included in the study indicated relatively high, and similar, levels of openness, conscientiousness, extraversion, agreeableness, and emotional stability. However, the range of scores observed indicate the need for educators to be prepared to work with a wide diversity of student personality dispositions (McKeachie & Svinicki, 2013). A limitation of the present study is the relatively small sample size, and associated limitations on generalizability of results. Although steps were taken to minimize any potential bias associated with the sample any implications or recommendations should be considered within the known limitations of the research (Ary et al., 2010). Nevertheless, an implication from these results is that agricultural educators should be flexible in their approach and sensitive to the needs of individual students. Developing skills as an educator to detect differences in introversion and extraversion, agreeableness, openness, conscientiousness, and emotional stability is critical to providing a meaningful learning environment for students (Doerfert, 2011; McKeachie & Svinicki, 2013)

The differences between goal orientation dispositions are also noteworthy. Paired sample t-tests conducted *post-hoc* indicated the observed mean scores were statistically significantly different. Specifically, the undergraduate agricultural leadership students in the sample had the highest level of LGO followed by PGOP. The lowest score was reported on the PGOA disposition. These results would indicate that the students in the sample tend to be most motivated by their desire to seek mastery over a subject matter, in this research agricultural leadership. However, a close secondary motivation to prove their competence in the material should also inform classroom motivational strategies. The lower PGOA value indicated that students are not motivated by their fear of being perceived as incompetent. For example, students may be more inclined to participate in classroom activities or discussions if they are passionate about the material, or have a desire to show how much they know more so than out of fear of being called on and not knowing the answer.

Based on the goal orientation results a recommendation would be that agricultural educators working with undergraduate leadership students represented by the research sample work to develop a more mastery, or LGO, learning environment. Providing a supportive environment for learners where intellectual risk taking is encouraged should result in more learner motivation. Allowing learners to revise and improve their writing, grading based on criteria rather than relative to other learners (on a curve), providing constructive feedback, and

dropping test questions that are missed by a significant proportion of learners are suggested approaches to align an undergraduate agricultural leadership classroom environment with the LGO results observed (Hofer, 2011). According to Hofer (2011) an LGO classroom discussion is visible when “students ask genuine questions to which they do not already know the answers, driven by a desire to better understand the material, rather than to impress their peers and the instructor” (p. 144). Future research is suggested to better identify the specific teaching tactics and approaches preferred by learners according to their goal orientation disposition.

An additional recommendation for agricultural educators working with undergraduate agricultural leadership students represented by the research sample would be to become proficient with PGO classroom strategies. For example, allowing for opportunities for students to actively share their experiences and insights through directive questions intended to elicit a specific response. Additionally, using assessment methodologies that balances the opportunity to explore responses, such as open-ended essay questions for LGO students balanced with multiple choice, matching, or fill in the blank approaches for PGO students (McKeachie & Svinicki, 2013). Finally, educators are recommended to minimize PGOA motivation when possible. For example, calling on students that do not know the correct answer with the intent of embarrassing them in front of their peers as a means to motivate them to learn may have the opposite motivational effect if learner self-efficacy is diminished (Stajkovic & Luthans, 1998).

From a theoretical perspective, the nature, and directionality, of the relationships between each personality factor and goal orientation disposition was explored through Pearson product-moment correlations (Ary et al., 2010). The results indicated LGO had a statistically significantly positive relationship to all personality factors with the exception of agreeableness. These results were unlike those of Bipp et al. (2008) that found non-significant relationships with emotional stability and conscientiousness as well as Culberston et al. (2009) that also found a non-significant relationship with emotional stability. PGO orientation had a statistically significant negative relationship with agreeableness and a positive relationship with extraversion. Findings were again inconsistent with Bipp et al. (2008) and Culbertson et al. (2009) where a statistically significant negative relationship with emotional stability was observed. PGOA had a statistically significant negative relationship with all personality factors with the exception of conscientiousness. These results were similar to those of Culberston et al. (2009) that reported statistically significant negative relationships across all personality factors. However, Bipp et al. (2008) observed statistically significant negative relationships within emotional stability and extraversion. An implication from the diversity of results relative to previous research is that the nature of the relationship between personality and goal orientation dispositions, particularly within a student population, is unclear. Future research with larger sample sizes representing a diversity of instructional content areas is recommended.

Extending beyond replication of previous study correlational analysis the results of the present study indicated that between 15% and 28% of the variance in goal orientation disposition was predicted by the Big-Five personality factors. These results confirmed the suggestion posed by Hough and Schneider (1996), specifically, goal orientation dispositions are compound traits composed of multiple personality factors. Table 7 summaries the directionality of the statistically significant personality predictors for each goal orientation disposition.

Table 7
Summary of Statistically Significant Personality Predictors of Goal Orientation Dispositions

	LGO	PGO-P	PGO-A
Emotional Stability	+	N/A	N/A
Conscientiousness	+	+	N/A
Agreeableness	N/A	-	-
Extraversion	N/A	+	-
Openness	+	N/A	-

It is essential that students of all personalities be accommodated with a learning curriculum that best fits their needs (McKeachie & Svinicki, 2013), consequently the results of this study indicate it may also be helpful for educators to create a curriculum that interweaves aspects of all goal orientations to best fit the five personality factors. For example, PGOP had an observed a relationship with extraversion. Within a classroom of undergraduate agricultural leadership students working in a leadership group project, it may be useful for educators to motivate more extraverted group members with not only the possibility of an A, but through successfully completing experiential learning opportunities that require more social and outgoing interfacing with peers. Conversely, more introverted, or agreeable, students can be accommodated for by providing a dedicated time for quiet reflection that does not require the need to demonstrate their competence in the material.

Future research is recommended to fully explore how personality and goal orientation may also serve to predict differential student outcomes such as performance or satisfaction, either at a project or class level. For example, effects of different styled curriculums based on personality and goal orientation to predict student selected goals may provide further information in the area of study. Through a better understanding of personality on goal orientation, agricultural educators are better able to create and provide an effective curriculum that students will not only excel academically in but also gain experiences that serve as learned lessons for future application.

If agricultural educators allocate time to engage students in meaningful conversations around the effects of personality on processing and creating goals, it may help to further gain increased student engagement. Even if certain learning styles and personality factors are not applicable to all, personality discussion allows students to view their capabilities and goals with more clarity (Lamm et al., 2014b). For example, previous studies suggest that classroom goal orientation styles may influence the patterns of adaptive motivation when goals for mastery are salient and fully adopted and understood by students regardless of dispositional antecedents (Ames & Archer, 1988). Improved engagement and attention, may in turn assist undergraduate students to attain higher levels of performance within various learning environments through a more meaningful connection with the material.

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Relationship Between Academic Engagement, Achievement, and Student Satisfaction Among Seniors in a Land Grant College of Agriculture

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Abstract

The purpose of this study was to describe self-reported grades, scores on 10 academic engagement indicators, and satisfaction of senior Agricultural, Food and Life Sciences (AFLS) students (n = 144) at a mid-south land grant university and to determine the relationship between grades, academic engagement, and student satisfaction. Students were satisfied with their experiences at the university. They reported being often engaged in 8 of the 10 indicators, but only sometimes engaged in indicators measuring Quantitative Reasoning and Student-Faculty Interactions. All engagement indicators except Reflective/Integrative Learning and Quantitative Reasoning were significantly ($p < .05$) related to student satisfaction; there was no significant correlation between self-reported grades and satisfaction. Two faculty-related engagement indicators, Student-Faculty Interaction and Effective Teaching, had low positive correlations ($r = .25$) with satisfaction. A linear combination of three engagement indicators, Quality of Interactions, Supportive Environment, and Learning Strategies, entered into a multiple regression equation and explained a significant ($p < .05$) percentage (30.0%) of the variance in student satisfaction. These results confirmed the importance of positive interpersonal relationships, quality study habits, and student support services to student satisfaction. Further research is needed to examine the relationship between teaching practices, curriculum, and other instructional variables and student satisfaction.

Introduction and Theoretical Framework

Student retention rates have been a cause of concern for university administrators for decades (Murtaugh, Burns, & Schuster, 1999). Nationally, the retention rate, defined as the percentage of non-graduating students returning to the same institution each academic year, was 70% for full-time students and 40% for part-time students in 2014 (“Persistence-Retention Snapshot Report”, 2015). Whether students return to their current institutions or drop out of college is depends on several factors (Bolton & Kannan, 2000) and depends on the students’ prior attitudes and satisfaction levels (Bearden & Teel, 1983; Oliver, 1980). Research reported by Bryant and Bodfish (2014) indicated student satisfaction played a more significant role in student retention than demographics or other institutional features. In addition to affecting retention, student satisfaction is also an important measure of institutional effectiveness. Researchers have concluded, “Student satisfaction with an institution is an important but sometimes overlooked variable in determining the quality of the undergraduate experience” (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006, p. 44).

Student satisfaction has been defined as a subjective attitude based on the student’s evaluation of his or her educational experiences (Athiyaman, 1997; Elliott, 2002; Elliott & Shin, 2002). Satisfaction results when educational experiences meet or exceed the student’s expectations, while dissatisfaction results when experiences do not meet expectations (Elliott, 2002; Hom, 2000). According to Elliott (2002), student centeredness and instructional effectiveness are primary contributors to enhanced levels of student satisfaction. Strahan and Crede (2015) found only a weak, positive correlation between grades and student satisfaction. Mark (2013) asserted that students are satisfied when their needs are fulfilled and they receive a quality education that is valued in the job market.

Student satisfaction is positively related to student retention, motivation, recruitment, and fundraising (Elliott & Shinn, 2002). Institutions with satisfied graduates also tend to have higher levels of public and political support (Weerts, Cabera, & Sanford, 2008). Thus, there is little wonder that colleges and universities are concerned with student satisfaction (Saunders, 2014), especially when one considers the proposition that there is no apparent benefit to producing dissatisfied students.

Academic engagement is a second indicator of academic quality (Chickering and Gamson, 1987) and is defined as the time and energy that students devote to educationally productive activities (Carini, Kuh, & Klein, 2006). Kuh (2003) stated that the premise of engagement is deceptively simple and even self-evident - when students study a subject more, they learn more about it. Academic engagement is one of the best predictors of student learning and personal development (Carini et al., 2006). Excellent undergraduate education is likely to occur at colleges and universities that maximize good practices (Chickering & Gamson, 1987) and enhance students' academic and social engagement (Pascarella, 2001).

One of the most commonly used methods of measuring academic engagement is the National Survey of Student Engagement (NSSE). Since 2000, NSSE has been completed by students at over 1500 U.S. and Canadian colleges and universities (McCormick, Gonyea, & Kin, 2013). NSSE measures student engagement using 10 engagement indicators: (a) Higher-Order Learning, (b) Reflective and Integrative Learning, (c) Learning Strategies, (d) Quantitative Reasoning, (e) Collaborative Learning, (f) Discussions with Diverse Others, (g) Student-Faculty Interaction, (h) Effective Teaching Practices, (i) Quality of Interactions, and (j) Supportive Environment. Pascarella, Seifert, and Blaich (2010) found each of these engagement indicators, except Student-Faculty Interaction, to be significantly related to important academic and/or personal development outcomes. Pascarella et al. (2010) posited that the lack of a significant relationship between Student-Faculty Interaction and any outcome variable was likely due to greater faculty interaction with both students who excel and with those who struggle.

Wefald and Downey (2009) found a significant, high positive correlation between a global measure of academic engagement and student satisfaction among undergraduates at Kansas State University. However, the researchers measured academic engagement using affective items [i.e., "I feel happy when I am studying intensively" (p. 102)] instead of behavioral items as used in the NSSE [i.e., "During the current school year how often have you . . . reviewed your notes after class?" (NSSE, 2013, p. 6)]. As a result, Wefald and Downey (2009) were unable to determine if there was an actual relationship between engagement and satisfaction or if "the engagement items . . . [were] tapping into some component of satisfaction" (p. 108). If the engagement and satisfaction scales were measuring the same construct a high, positive correlation would be expected and essentially meaningless. In addition, because Wefald and Downey (2009) used a global measure of engagement, they could not determine what specific types of academic engagement (i.e., Higher-Order Learning, Student-Faculty Interaction, etc.) were related to student satisfaction. The authors recommended further research to clarify the relationship between academic engagement and student satisfaction.

Johnson, Graham, & Wardlow et al. (2009) used NSSE data to compare agriculture and non-agriculture students and found that both freshmen and senior agriculture students had significantly higher scores on the Student-Faculty Interaction engagement indicator. However, the researchers found no significant difference in satisfaction between agriculture and non-agriculture students. No attempt was made to determine the relationship between academic engagement and student satisfaction.

Theoretical Framework

Satisfaction models have their basis in empirical and theoretical work in marketing where customer satisfaction and repurchase decisions are the primary focus (Hom, 2000). While many academics (Albanese, 1999; Buck, 2002; Franz, 1998) resist the notion of students as customers, others (Mark, 2013; Saunders, 2014) embrace this

notion and contend a focus on students as customers will enhance the quality of post-secondary education. Taylor (1996) specifically recommended the application of customer satisfaction models to higher education.

According to Hom (2000) and Szymanski and Henard (2001), customer satisfaction models are basic discrepancy models. In these models, customers evaluate their experience with a product or service against their expectations; if the product or service meets or exceeds expectations (confirmation), satisfaction will result; if expectations are not met (disconfirmation), dissatisfaction will result.

Figure 1 is based on the satisfaction model described by Hom (2000) as adapted for this study. In the adapted model, students hold certain expectations of their ideal or acceptable level of engagement against which they evaluate their actual engagement experiences, leading them to either confirm or disconfirm their expectations. This action results in higher or lower levels of satisfaction. The model also shows the reciprocal relationship between expectations and experiences whereby initial expectations influence perceptions of actual experiences and actual experiences influence subsequent expectations.

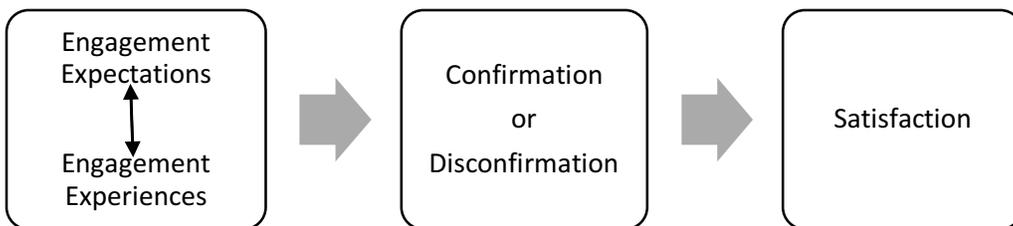


Figure 1. Student engagement and satisfaction model. Adapted from Hom (2000).

This research sought to determine which, if any, of the 10 NSSE engagement indicators were significant in predicting student satisfaction. Operationally, since only data on levels of engagement and satisfaction were available for analysis, student expectations and confirmation/disconfirmation were, of necessity, only inferred through the relationship between engagement and satisfaction. Thus, while the model in Figure 1 guided the study by providing an explanation of the relationships between constructs within the phenomenon of student satisfaction (Gall, Borg, & Gall, 1996), this research does not provide a direct test of the theoretical model.

According to Chickering and Gamson (1987), it is the responsibility of teachers and students to improve undergraduate education. One promising method for improving undergraduate education is through increased levels of academic engagement (Kuh, 2003). Research is needed to identify the extent to which specific engagement indicators are related to student satisfaction because engagement and satisfaction play such an important role in student retention. This study aligns with the American Association for Agricultural Education's research agenda (Doerfert, 2011) by contributing to the profession's understanding of meaningful and effective learning environments.

Purpose and Objectives

The purpose of this study was to examine the relationship between 10 behavioral measures of student engagement, student self-reported academic achievement, and student satisfaction among senior Agricultural, Food and Life Sciences (AFLS) students attending a mid-South land grant university. Specific objectives were to:

1. Describe the academic engagement, self-reported grades, and satisfaction of senior AFLS students;
2. Determine the relationships between academic engagement indicators, self-reported grades, and satisfaction among senior AFLS students; and

- Determine if a single or linear combination of engagement indicators and/or self-reported grades could explain a significant ($p < .05$) portion of the variance in the satisfaction of senior AFLS students.

Methods

The population for this study included all AFLS seniors ($N = 588$) enrolled during the spring 2013 semester at the University of Arkansas (Office of Institutional Research, 2013a). For the spring 2013 NSSE administration, a random sample of 370 AFLS seniors received email messages inviting them to complete the NSSE; a link embedded in the email allowed participants to access the on-line survey. Data were collected from 144 seniors for a 38.9% response rate; this response rate was somewhat higher than the overall university response rate of 33.5% (Office of Institutional Research, 2013b).

To test for non-response bias, respondents were compared to the population of AFLS seniors on the available demographic variables of gender and ethnicity (Miller & Smith, 1983) using demographic data obtained from the university Office of Institutional Research (2013a). Chi square analyses found no statistically significant ($p < .05$) differences in gender or ethnicity between the respondents and the population. Kuh (2003) compared a national sample of NSSE non-respondents (via telephone interviews) with NSSE respondents and concluded that “few meaningful differences exist between respondents and non-respondents in terms of their academic engagement” (p. 13). Thus, based on the demographic analysis and the findings of Kuh (2003), the researchers judged these findings as generalizable to the population.

The 2013 NSSE contained 10 multi-item engagement indicators (NSSE, 2013a): (a) Higher-Order Learning (4 items), (b) Reflective and Integrative Learning (7 items), (c) Learning Strategies (3 items), (d) Quantitative Reasoning (3 items), (e) Collaborative Learning (4 items), (f) Discussions with Diverse Others (4 items), (g) Student-Faculty Interaction (4 items), (h) Effective Teaching Practices (5 items), (i) Quality of Interactions (5 items), and (j) Supportive Environment (8 items). For items in 9 of the 10 indicators, students rated the frequency (or extent) which they engaged in a specific behavior during the current academic year using a 1 - 4 scale [1 = *Never* (or *Very Little*); 2 = *Sometimes* (or *Some*); 3 = *Often* (or *Quite a Bit*); and 4 = *Very Often* (or *Very Much*)]. Students rated items in the Quality of Interactions indicator using a 1 - 7 anchored scale (1 = *Poor* and 7 = *Excellent*).

After administration, each engagement item was converted to a 0 to 60 scale and the rescaled items for each engagement indicator were averaged. An engagement indicator score of 0 represented an individual answering at the bottom of the scale for each item in the indicator, while a score of 60 represented an individual responding at the top of the scale for each item in the engagement indicator (NSSE, 2013b). These scale conversions were made by NSSE staff and included in the data set provided to the researchers.

NSSE (2015) reported coefficient alpha engagement indicator reliabilities ranging from .77 (Learning Strategies) to .90 (Discussions with Diverse Others) for the 2013 NSSE. For 2013 University of Arkansas senior AFLS respondents coefficient alpha reliability estimates ranged from .70 (Learning Strategies) to .92 (Discussions with Diverse Others). Extensive testing (NSSE, 2015) has shown that NSSE possess construct, content, known groups, and concurrent validity.

Student satisfaction was measured by responses to two NSSE items. The first item asked students to evaluate their entire educational experience at the University of Arkansas on a 1 - 4 scale (1 = *Poor*; 2 = *Fair*; 3 = *Good*; and 4 = *Excellent*). The second item asked students if they could start over again would they choose to attend the University of Arkansas; this item was also assessed on a 1 - 4 scale (1 = *Definitely No*; 2 = *Probably No*; 3 = *Probably Yes*; and 4 = *Definitely Yes*). Responses to these two items were averaged for each respondent and

used as a measure of satisfaction. In interpreting the mean satisfaction score, the following real limits and descriptors were used: 1.0 to 1.75 = Dissatisfied; 1.76 to 2.50 = Somewhat Dissatisfied; 2.51 to 3.25 = Somewhat Satisfied; and 3.26 - 4.0 = Satisfied. For 2013 University of Arkansas respondents, the coefficient alpha reliability estimate for student satisfaction was .79.

Respondents self-reported their grades in response to the question, “What have been most of your grades up to now at this institution?” Eight response options were provided, ranging from “A” to “C- or below.” Cole, Rocconi, and Gonyea (2012) evaluated the validity of NSSE self-reported grade data by comparing them to institutionally-reported GPAs for 12,650 undergraduates participating in the 2011 NSSE and found that “A” students were very accurate in their reporting (91.3% match), “B” students were fairly accurate (70.0% match), and “C” students were least accurate (42.5% match). Kuncel, Crede, and Thomas (2005) concluded that self-reported grades can be useful, but caution must be exercised in interpreting results.

After institutional IRB protocol approval, the university Office of Institutional Research provided the researchers with the raw data file that included AFLS senior student responses ($n = 144$) to the spring 2013 administration of NSSE. To preserve respondent anonymity, the data file did not contain any information that would allow the researchers to match responses to specific individuals.

Data were analyzed (in SAS version 9.3) using descriptive statistics, bivariate correlations, and linear multiple regression. The 0.05 level of significance was set *a priori* for correlation analysis and for the overall significance test in multiple regression; however, the 0.10 level of significance was set, also *a priori*, for testing significance of individual predictor variables (Hair Anderson, Tatham, & Black, 1998).

Results

Of the 144 senior AFLS students responding to the 2013 NSSE, a majority were female (72.2%) and of non-minority (83.3%) ethnicity. Approximately 9 in 10 seniors reported earning mostly grades of B or higher (87.4%) while 42.3% reported earning mostly A’s (27.0%) or A-’s (15.3%).

Senior AFLS students rated Quality of Interactions, Discussions with Diverse Others, and Effective Teaching Practices as the most frequently occurring engagement indicators (Table 1). Eight of the 10 engagement indicators were rated as occurring “often” (or “quite a bit” or “good”) while two indicators (Quantitative Reasoning and Student-Faculty Interaction) were rated as occurring “sometimes.” There was a large degree of variability associated with each engagement indicator with coefficients of variation ranging from 23.4% (Quality of Interactions) to 65.8% (Student-Faculty Interaction).

Overall, students were “satisfied” with their college experiences as indicated by a mean of 3.39 ($SD = 0.63$) on the two-item satisfaction variable (Table 1). With a coefficient of variation of 18.6%, there was less relative variation in student responses to the satisfaction variable as compared to the 10 engagement indicators.

Table 1

Means and Standard Deviations for Academic Engagement Variables and Student Satisfaction

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	Descriptor ^x
Higher-Order Learning	135	37.03 ^z	14.72	Quite a Bit
Reflective/Integrative Learning	137	36.34 ^z	11.46	Often
Learning Strategies	119	38.15 ^z	13.67	Often

Quantitative Reasoning	134	29.80 ^z	16.55	Sometimes
Collaborative Learning	135	34.74 ^z	14.29	Often
Discussions with Diverse Others	121	41.69 ^z	16.31	Often
Student-Faculty Interaction	136	26.95 ^z	17.72	Sometimes
Effective Teaching Practices	136	40.59 ^z	13.99	Often
Quality of Interactions	119	44.08 ^z	10.34	Good
Supportive Environment	116	33.31 ^z	12.43	Quite a Bit
Student Satisfaction	114	3.39 ^y	0.63	Satisfied

^zConverted to a 0 to 60 scale where higher scores represented higher levels of engagement. ^yMeasured on a 1 to 4 scale where 1 = low satisfaction and 4 = high satisfaction.

^xBased on descriptors supplied by NSSE (2013b).

Eight of 10 engagement indicators had significant ($p < .05$) positive correlations with student satisfaction (Table 2). Using descriptors suggested by Davis (1973), these correlations ranged from small to moderate. Supportive Environment ($r = 0.37$), Quality of Interactions ($r = 0.43$), and Higher-Order Learning ($r = 0.30$) were moderately correlated with student satisfaction (Davis, 1973). Two faculty-related engagement indicators, Student-Faculty Interaction and Effective Teaching, had low (Davis, 1973) positive correlations with student satisfaction. The Reflective and Integrative Learning and the Quantitative Reasoning engagement indicators and self-reported student grades were not significantly related to student satisfaction.

The intercorrelations between the 11 potential predictor variables (10 engagement indicators plus self-reported grades) ranged from non-significant to moderate (Davis, 1973). Of particular interest, only two engagement indicators, Quantitative Reasoning and Student-Faculty Interaction, were significantly related to self-reported grades and these correlations were small (Davis, 1973).

Prior to regression analysis, data were evaluated for outliers; regression diagnostics were used to determine if data met the assumptions of linearity, homoscedasticity, and normality of the error term distribution; and predictor variables were examined for multicollinearity (Hair et al., 1998).

Examination of the plot of residuals revealed four outliers; these outliers were removed and the data were reanalyzed. Linearity was assessed through visual evaluation of each potential predictor variable plotted against the dependent variable; all predictor variables exhibited linearity with student satisfaction. Homoscedasticity of residuals was assessed graphically and since no pattern of increasing or decreasing residuals was found, this assumption was determined to have been met (Hair et al., 1998). The results of the Shapiro-Wilk test ($W = 0.98$, $p = 0.42$) indicated the assumption of normality of residuals was met. Finally, the variance inflation factors (VIF) ranged from 1.24 to 1.57, well below the VIF of 10.0 suggested by Hair et al. (1998) as indicating potential multicollinearity problems.

Table 2

Intercorrelations and Cronbach's Alpha Reliability Estimates for Predictor (X1 – X11) and Criterion Variables (X12)

Variable	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12
Higher-Order Learn. (X1)	(.85)											
Reflect./Integ. Learn. (X2)	.45***	(.85)										
Learning Strategies (X3)	.27**	.25**	(.70)									
Quant. Reasoning (X4)	.51***	.43***	.19 ^{NS}	(.89)								
Collaborative Learn. (X5)	.33***	.34***	.14 ^{NS}	.43***	(.83)							
Discuss./Div. Others (X6)	.35***	.33***	.46***	.20*	.28**	(.92)						
Student-Fac. Interact. (X7)	.40***	.32***	.19*	.35***	.46***	.30**	(.87)					
Eff. Teaching Prac. (X8)	.35***	.11 ^{NS}	.17 ^{NS}	.38***	.16 ^{NS}	.10 ^{NS}	.32***	(.87)				
Quality of Interact. (X9)	.16 ^{NS}	.12 ^{NS}	.24*	.12 ^{NS}	.11 ^{NS}	.29**	.26**	.40***	(.75)			
Supportive Env. (X10)	.30**	.28**	.26**	.23*	.19*	.32***	.25**	.23*	.32***	(.87)		
Grade (X11)	.12 ^{NS}	.04 ^{NS}	.21*	.05 ^{NS}	-.04	.17 ^{NS}	.25**	.12 ^{NS}	.15 ^{NS}	.01 ^{NS}		
Student Satisfaction (X12)	.31***	.09 ^{NS}	.29**	.15 ^{NS}	.26**	.25**	.25**	.25**	.43***	.37**		

Note. Reliability estimates (Cronbach's alpha) appear on the diagonal above correlation coefficients.

^{NS}Not significant; * $p < .05$; ** $p < .01$; *** $p < .001$ Student satisfaction was regressed on a linear combination of the eight statistically significant predictor variables. The resulting regression equation was significant [$F(8, 88) = 4.63, p < .001$] and explained 30% of the variance in student satisfaction. According to Cohen (1988), the R^2 of 0.30 (adjusted $R^2 = .23$) represents a large effect. As shown in Table 3, Quality of Interactions, Supportive Environment, and Learning Strategies were all statistically significant ($p < .10$) in predicting student satisfaction. The remaining five engagement indicators did not explain statistically significant increments of variance in student satisfaction. Examination of the Beta weights (b) and squared semipartial correlations (sr^2) indicated Quality of Interactions was the best predictor of student satisfaction (explaining 6.0% of unique variance), followed by Supportive Environment (2.8%), and Learning Strategies (2.4%).

Table 3

Beta Weights and Squared Semipartial Correlations Obtained in Multiple Regression Analyses Predicting Student Satisfaction

Predictor	<i>B</i>	<i>SE B</i>	<i>b</i>	<i>t</i>	<i>sr</i> ²
Quality of Interactions	0.016	0.006	0.293	2.73***	.060***
Supportive Environment	0.008	0.004	0.186	1.87*	.028*
Learning Strategies	0.007	0.004	0.173	1.74*	.024*
Collaborative Learning	0.005	0.004	0.133	1.26 ^{NS}	.013 ^{NS}
Higher-Order Learning	0.004	0.004	0.102	0.95 ^{NS}	.007 ^{NS}
Discussions w/Diverse Others	-0.001	0.004	-0.041	-0.39 ^{NS}	.001 ^{NS}
Effective Teaching Practices	0.000	0.004	0.010	0.09 ^{NS}	.000 ^{NS}
Student-Faculty Interaction	0.000	0.003	0.004	0.03 ^{NS}	.000 ^{NS}

Note. $R^2 = .30$; adjusted $R^2 = .23$.

^{NS}Not significant. * $p < .10$. ** $p < .05$. *** $p < .01$.

Summary, Conclusions, and Recommendations

This study sought to describe and determine the relationships between 10 academic engagement indicators, self-reported grades, and student satisfaction among 144 senior AFLS students at a mid-south land grant university. On the 0 - 60 scale, seniors rated the Quality of Interactions engagement indicator highest and Student-Faculty Interactions lowest. Students reported fairly high (often, quite a bit, or good) levels of engagement in eight of the 10 indicators, but reported lower levels of engagement (sometimes) in Student-Faculty Interaction and Quantitative Reasoning. There was a high degree of variability within each academic engagement indicator suggesting that students in the same college can have very different academic experiences, likely depending on their own specific majors and particular interests and motivations.

Senior AFLS students were satisfied with their experiences at the University of Arkansas as indicated by a mean satisfaction score of 3.39 ($SD = 0.63$) on a four-point scale. Apparently, AFLS seniors' experiences at the University of Arkansas largely met their expectations (Mark, 2013) and, consequently, the university and college can expect these future alumni to be potential sources of financial (Elliott & Shin, 2002) and personal (Weerts et al., 2008) support.

Grades were not significantly correlated with student satisfaction or with any engagement indicator other than Learning Strategies and Student-Faculty Interaction, where only low positive correlations were found. The finding of no relationship between grades and satisfaction is largely consistent with Strahan and Crede (2015) who found only a weak correlation between grades and student satisfaction. The lack of any significant relationship between grades and 8 of the 10 engagement indicators is surprising, given the link between student engagement and academic achievement reported by Carini et al. (2006). However, since self-reported grades of unknown validity (Kuncel et al., 2005) were used in this analysis, no substantive conclusion can be reached; further research examining the relationships between university-reported official grade point averages and each of the 10 engagement indicators and student satisfaction is warranted.

Eight of the 10 engagement indicators had significant positive correlations with student satisfaction, with magnitudes ranging from low to moderate (Davis, 1971). Reflective and Integrative Learning and Quantitative Reasoning were not significantly related to student satisfaction. Student-Faculty Interaction had a low positive correlation with both student satisfaction and student grades while Effective Teaching had a low positive correlation only with student satisfaction. Further research should be conducted to more fully understand the relationship between these two faculty-related engagement indicators and student grades and satisfaction.

A linear regression equation containing three engagement indicators (Quality of Interactions, Supportive Environment, and Learning Strategies) was statistically significant and explained 30% of the variance in student satisfaction. Quality of Interactions was the most important predictor explaining approximately 6.0% of the unique variance, followed by Supportive Environment (2.8%), and Learning Strategies (2.4%). These findings are consistent with Elliott (2002), who reported that institutional student-centeredness is a primary contributor to student satisfaction. However, Elliott's (2002) contention that instructional effectiveness is related to student satisfaction is supported only to the extent that effective instruction contributed to the use of good learning and study practices (Learning Strategies).

The Quality of Interactions engagement indicator asked students about their relationships with other students, their academic advisors, faculty, student services staff, and other administrative staff and offices. The Supportive Environment indicator asked students about the university's emphasis on academics and academic support services, support for non-academic responsibilities (work and family), and providing social, cultural and recreational opportunities. Finally, the Learning Strategies indicator asked students how often they identified key information in readings, reviewed notes after class, and summarized class material. Thus, in plain language, the best predictors of satisfaction for AFLS seniors were quality student-faculty-staff relationships, a stimulating and supportive campus environment, and the extent to which the student practiced good learning habits. AFLS faculty and administrators, as well as campus administrators, should place special emphasis on enhancing each of these.

While this study confirmed the relationship of positive interpersonal relationships, quality student support services, and effective learning and study practices to higher levels of student satisfaction, these three factors combined explained only 30% of the variance in the satisfaction of senior AFLS students. Further research is recommended to identify additional factors contributing to student satisfaction.

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Perceptions of Agricultural Careers for African American Students Through the Lens of the Holistic Development Theory

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Abstract

Through the use of Q-methodology, this study sought to more fully understand the subjective opinions held by secondary African American students involved in a summer REYAP (Retired Educators for Youth Agricultural Programs) program. Thirty-five African American students sorted forty statements derived from a structured one by four concourse (McKeown & Thomas, 1980). The concourse structure is based on the Holistic Development Theory (author, in preparation) which includes four domains: a) thinking, b) doing, c) feeling, and d) creating. The condition of instruction was: "What interests you about Agriculture?" and analysis followed Brown's (1980) Q-methodological procedures (correlation, factor analysis, rotation). Three perspectives emerged from the analysis: Not Me, Good Enough, and New to Me. The Not Me position viewed agriculture in a positive light, however, they could not see themselves in the agricultural industry. Meanwhile, the Good Enough perspective desired to be part of the agricultural industry because they perceived it was a noble and valued hard work. The final view, New to Me, was just experiencing agriculture for the first time but did not feel as though they fit in. Conclusions, implications and recommendations are offered for each of the emergent perspective.

Perceptions of Agricultural Careers for African American Students Through the Lens of the Holistic Development Theory

The lack of African American involvement in American agriculture is a chronic and complicated issue. Research (Arrington & Price, 1983; Bowen, 1994; Graham, 2007; Larke & Barr, 1987; Luft, 1996; Osborne, 1994; Talbert & Larke, 1995) seeking to understand this phenomena purported a somewhat broad conclusion that the lack of minority involvement is a product of the negative perceptions African Americans hold towards agriculture as an industry. Croom (2007) stated that, "during the latter part of the 19th century, as white industrial schools formed into engineering and the professional sciences, industrial schools for African American tended to focus on less ambitious goals" (p. 18).

Lewis (2000) maintained that for many African Americans post-secondary education is often the first time they get introduced to the field of agriculture (Lewis, 2000). To explore the complexities of this problem further, Westbrook and Alston (2007) analyzed African American students that chose to pursue a career in agriculture. They noted that many African Americans working in the agricultural industry had positive experiences through 4-H and FFA (Westbrook & Alston, 2007). A lack of early exposure to agriculture, however, seemed lead to undesirable views of the industry (Westbrook & Alston, 2007). For example, Jones and Brown (1998) explained, African American students were less positive than other students about the image of the agricultural sciences, the perceived future value, and the role of the others significant in their decisions to enroll in agricultural science courses. (pp. 43-44)

Because African American's hold negative perceptions of agriculture, Jones and Brown (1998) suggested that school-based, agricultural education (SBAE) programs might need to make additional efforts to showcase the diverse opportunities available through their programs. Further, the award structure available through SBAE's

youth organization, FFA, should also be promoted more purposefully (Jones & Bowen, 1998). Through emphasizing opportunities for success and achievement through youth agriculture organizations, African Americans might be more willing to join and become involved (Jones & Bowen, 1998). SBAE instructors play a role in recruiting students to enroll in agricultural classes (Jones & Bowen, 1998). Some researchers suggest that African American students may develop a stronger relationship with instructors of a similar ethnic background (Jones & Bowen, 1998). Despite the opportunity to attract more African American students, however, minorities seem to have a number of barriers that prevent them from getting involved (Jones & Bowen, 1998).

Graham (2007) began to further specify the minority issue by giving voice to the concept of culture and lack of congruency between the culture of agriculture and African Americans that can be traced to the slavery conditions over 130 years ago (Jones & Bowen, 1998). Other plausible explanations include the lack of interest in careers and specific job tasks in agriculture (Jones & Larke, 2001), lack of educational funding (Westbrook & Alston, 2007), homogenous curriculum foci and resources (Warren & Alston, 2007), and few examples of minority involvement and mentorship (Jones & Larke, 2001).

Research Problem and Purpose of the Study

The purpose of this study was to understand the perceptions African American's held of careers in agriculture. The involvement of diversity in agricultural careers is a chronic problem. Studies have led to the broad conclusion that a lack of minority involvement is the product of negative perceptions of the agricultural industry (Arrington & Price, 1983; Graham, 2007; Larke & Barr, 1987; Luft, 1998; Talbert & Larke, 1995). The research question guiding this study is: *What perceptions do African American students have regarding careers in agriculture?*

Theoretical Framework

In order to broadly represent potential opinions and reactions to agricultural careers from the point of view of African American adolescents, a four-quadrant theory of holistic education (Clark, 2004; Haynes, 2009; Miller, 1991) was used as a theoretical framework. Adapted from American Indian medicine wheel (McCabe, 2006; Meadows, 1992; 1996), developmental components of human functioning are described within the theoretical model (See Figure 1) in four areas: cognitive, social/emotional, psychomotor, and creative. Not all areas have developmental stages designed as appropriate for adolescents; however, cognitive and social psychologists have a long history of studying adolescents' development. The translation of developmental theories to educational practice and planning can be simplified to include (Montgomery, Strunk, Steele, & Bridges, 2012) thinking (cognitive), feeling (social/emotional), doing (psychomotor), and creativity (creative expression). Thinking represents the knowledge development, theories, and conceptual understanding in teaching and learning; whereas, feeling represents the opportunity to socially construct new meaning, interacting with others and expression of emotion or feelings. Doing quadrant represents the activities of learning, working, or play. The physical acts of engaging with the content under study.

Creating is the opportunity to go beyond what is known to what might be possible, innovation, problem solving, and novelty. The four quadrant holistic theory was used to structure the comments heard from adolescents and others with agricultural experience.

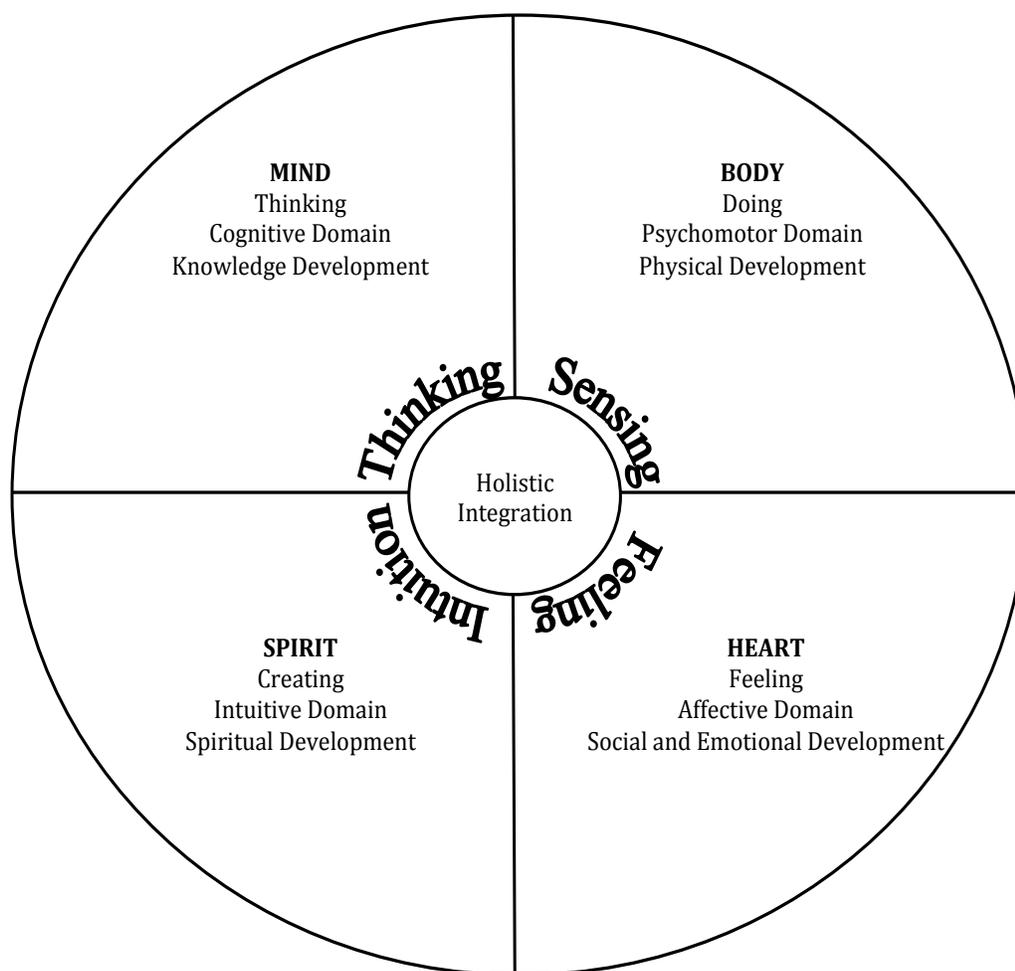


Figure 1. Holistic Development and Education Model

Methods and Procedures

Each of the 35 sorters in this study was a participant in a summer REYAP program. The intent of the REYAP program was to introduce African American youth to the agricultural industry. Our goal, therefore, was to understand their views of agricultural careers. We recognized that human perception is subjective phenomenon; therefore, we agreed that a Q methodological approach was best suited for meeting the study's purpose (McKeown & Thomas, 2013).

Q methodology, designed by William Stephenson, utilizes a unique data collection technique, called a Q-sort, to understand participant's major views on a topic (Watts & Stenner, 2013). Through this technique, each participant arranges his or her views on a forced distribution [see Figure 3] (McKeown & Thomas, 2013). Q draws from both quantitative and qualitative approaches in order to give a fuller, more nuanced depiction of each perspective. An interesting feature of Q methodology is that employs purposeful sampling techniques so that researchers can collect the full range of perspectives on a topic (Watts & Stenner, 2013).

To begin, participants were given a set of 40 randomized statements. Each participant was then asked to sort the statements into three distinct categories: (a) most like my interest, (b) neutral, (c) most unlike my interest (McKeown & Thomas, 2013). Next, they placed each statement onto a foam board with a forced distribution ranging from -5 to +5. After each participant completed this task, we used to PQMethod version 2.35 to enter the data for analytic procedures (Schmolck, 2014). Using this software, each sort was correlated and placed in a correlation matrix.

Through the assistance of PQMethod, we then used principle component analysis (PCA) to factor analyze the correlations between sorts and reduce them into distinct factors (Schmolck, 2014). In Q, the PCA technique differs traditional R methodological approaches because correlations are made between sorters rather than items (Brown, 1980). After factors were identified, we developed data profiles to analyze each factor at the gestalt level (Watts & Stenner, 2013). Then, through an in-depth thematic analysis, several themes emerged for each factor (McKeown & Thomas, 2013). Thereafter, we mobilized the themes into a narrative of each perspective to promote greater transferability of the study’s findings.

Instrument Development

Sampling the concourse for the Q set of statements for participants to sort was done by using a one by five conceptual framework resulting in 40 statements as shown in Table 1.

Table 1.

Conceptual categories of the Q-set

Concept	Description of Concept	# of Statement
Cognitive	Statements that relate cognitive processes and rigor to agriculture	10
Social/Emotional	Statements that include an emotional draw to agriculture	10
Psychomotor	Statements revolved around the daily tasks involved with agriculture.	10
Creative	Statements related to the opportunity to be innovative in agriculture	10

The statements were organized to reveal four homogenous concept groups. Heterogeneity was then sought within each concept in order to present different ways of approaching the overall concept. The form board (see Figure 3) is the forced distribution where participants place cards in relation to the others to identify the statements that resonate most like or most unlike their reactions personally. Factors that emerge from this process represent shared perspectives that exist within a particular group of people (Brown, 1980).

WHAT INTERESTS YOU ABOUT AGRICULTURE?

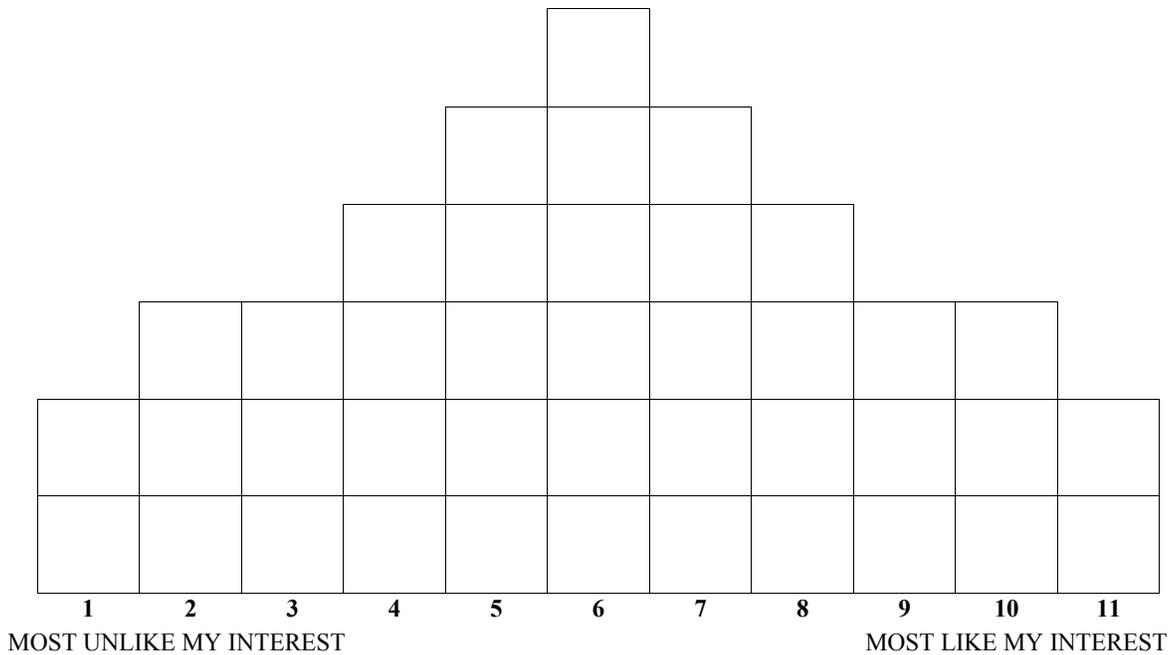


Figure 3.

Form board structure utilized for this study.

Results

The chosen solution involved a three-factor principal component analysis followed by a varimax rotation. Examination of the factor matrix (see Table 2) for the purpose of finding the sorts that best define the final factor array was done by choosing sorts that were statistically-significant for only one factor. A participant’s sort was considered to define a factor if the correlation of the sort to the factor was statistically significant as determined by the equation: $(1/\sqrt{\text{number of statements}}) * 2.6$ (McKeown & Thomas, 1988). Using this equation as a guideline, 0.41 was determined to be the standard by which sorts were determined to be significant to the study. The distributions of the sorts across the factors are reported in Table 2.

Table 2.

Factor Matrix with Bold Marking Defining Sorts

Sort#/ Gender	Age	Intent to Enter Ag Career	Factor Loadings		
			1	2	3
2-female	17	Yes	0.7254	-0.0931	0.1538
3-female	16	No	0.6825	-0.0420	-0.0372
4-female	18	Yes	0.6630	0.1699	0.3870
8-female	16	No	0.4663	0.3059	0.0595
10-male	15	Yes	0.5613	0.2568	0.3490
15-male	15	No	0.7758	-0.0707	-0.1648
16-male	16	Yes	-0.7050	0.2143	-0.0336

Sort#/ Gender	Age	Intent to Enter Ag Career	Factor Loadings		
			1	2	3
19-male	15	No	0.6901	-0.1512	-0.0628
20-female	17	Unknown	0.5859	-0.1262	-0.0319
21-male	15	No	0.4142	0.0027	0.1559
24-female	19	Yes	0.6380	0.2306	0.2527
5-female	16	No	0.2357	0.7339	-0.0915
9-male	17	Yes	-0.2541	0.7690	-0.2583
11-female	15	Yes	-0.0043	0.6169	0.3792
12-male	16	Yes	-0.0865	0.4755	-0.0344
18-female	17	No	0.1535	0.7375	0.0599
1-female	17	Unknown	0.1549	0.0078	0.6377
6-male	16	No	0.2834	-0.1228	0.6107
13-male	15	Yes	0.2264	0.1470	0.5868
22-male	14	Yes	0.3871	0.2053	-0.4166
23-female	14	Yes	-0.2105	0.0333	0.8004
7-male	16	No	0.3648	0.0214	0.3729
14-male	13	No	0.2692	0.0024	-0.3185
17-female	16	Yes	-0.1480	0.3348	0.0671
# of Defining Sorts			11	5	5
% Explained Variance			22	12	12

Note. Factor loadings in boldface indicate a defining sort.

Factors that are in boldface met the criteria and are used when defining the factor and its meaning. The factor score demonstrates the level of similarity. For example, sorter number twenty-three would be considered a high and pure loader as she loaded relatively high on the first factor and low on the other two. The sorts of high and pure loaders are expected to most closely define the sort, and as such, these individuals were contacted in order to confirm the interpretation of the factors. If an individual was somewhat similar to more than one view, like sorter number six, the sort was not used to define the resulting arrays and was considered to be a confounding sort. If a sort did not meet the statistical level of significance on any of the factors, it was not considered to be a defining sort. In this study, eleven sorts defined the first factor, five defined the second, and five defined the third. None of the sorts were non-significant in this study and three were considered confounded. Another statistic important to note is the correlation of the three identified factors to each other. This analysis provided an indication of how different or how alike the chosen factors were to one another. In this study correlations were $r = -0.00$ (1-2); 0.10 (1-3); and -0.03 (2-3), indicating that the solution chosen represented different viewpoints.

Three factors emerged from the analysis. Each of these factors represent a perspective one in higher education may hold in regards to agricultural education at the secondary level. Each perspective will be described in narrative form to describe the perspective of those who defined the specific perception. Specific statements will be provided to support the concepts that drive the narrative as the perspectives are based on the reconstructed

factor arrays (noted in parentheses with the statement number, *z-score*, and array position noted in that order). Appendix A provides the sorted rankings for each of the arrays that represent the three perspectives. The array position of every statement discussed includes array positions and z-scores to allow statement comparisons for each perspective.

Perspective A: Not Me.

Eleven participants held the view they did not belong in agriculture (23, -5, -2.045). Agriculture was seen as a rigorous discipline that was appropriate for some (6, +4, 1.321). However, those holding this perspective felt that agriculture was simply not for them (33, -4, -1.538). The “not me” perspective was demographically diverse with six female and five male sorters, ranging in age from 15 to 19 years. From their angle, agriculture is an innovative and technology-driven industry that makes a difference in the lives of others (28, +5, 1.590). However, those holding this perspective seemed to feel as though they did not fit the mold, or even fit in (21, -5, -1.916). Therefore, this disconnect seemed to fuel feelings of distaste for the industry (32, -4, -1.704).

Agricultural jobs were seen as difficult and uninteresting (32, -4, -1.704). Therefore, these individuals did not see relevance in pursuing a major or degree in an agriculturally related field (33, -4, -1.538). Further, they expressed the agricultural industry did not provide them with an emotional connection (23, -5, -2.045). Therefore, they could not see themselves getting passionate about the industry or advocating for agricultural issues. They simply had no interest in getting involved or feeling more deeply connected (21, -5, -1.916). This detachment seemed to stoke deep, powerful beliefs they did not belong in agriculture.

Table 3

“Not Me” Array Statements

No.	Statement	<i>Holistic Category</i>	<i>Z-scores</i>	Array Pos.
<u>Nine highest ranked “most like” statements</u>				
28	Working in agriculture means helping others.	Feeling	1.590	+5
8	Agricultural careers are all about ideas.	Creating	1.334	+5
6	Agriculture includes much more than people think.	Creating	1.321	+4
40	Agriculture is a very laboratory based career.	Thinking	1.203	+4
7	Agriculture must be inventive to feed the world.	Creating	1.194	+4
<u>Nine highest ranked “most unlike” statements</u>				
23	I love the agricultural industry.	Feeling	-2.045	-5
21	I belong in the agricultural community.	Feeling	-1.916	-5
32	I enjoy the daily tasks of agricultural jobs.	Doing	-1.704	-4
33	I look forward to getting a job in agriculture.	Doing	-1.538	-4
22	My family has a deep connection to agriculture.	Feeling	-1.487	-4
<u>“Most like” and “Most Unlike” highest ranked distinguishing statements</u>				
<i>Most Like</i>				
8	Agricultural careers are all about ideas.	Creating	1.334	+5
6	Agriculture includes much more than people	Creating	1.321	+4

No.	Statement	<i>Holistic Category</i>	<i>Z-scores</i>	Array Pos.
40	think. Agriculture is a very laboratory based career.	Thinking	1.203	+4
<i>Most Unlike</i>				
23	I love the agricultural industry.	Feeling	-2.045	-5
21	I belong in the agricultural community.	Feeling	-1.916	-5
32	I enjoy the daily tasks of agricultural jobs.	Doing	-1.704	-4

Perception B: Good Enough

Five defining sorts comprised the agriculture is “good enough for me” perspective. This viewpoint was relatively diverse among participants with three males and two females. Most of the sorters in this view saw agriculture as a potential career path because it was honest work (25, +4, 1.119). They also believed the agricultural industry was a non-academic field that was more vocationally driven (40, -5, -1.938). This idea seemed to help these individuals feel confident because they perceived it was a career in which they could find success (27, +5, 1.771). These feelings of confidence ultimately seemed to enhance their motivation to pursue an agricultural career path in the future (25, +4, 1.119).

Participants also seemed to hold the belief that agriculture was a field they could grow passionate about. They seemed to find jobs associated with agriculture as needed and interesting (28, +5, 1.886). Further, duties and tasks in agriculture would also allow them to promote self-fulfillment through their career (27, +5, 1.771). Through these feelings of competence, sorters in this perspective also expressed that agriculture would be a smart career decision. Therefore, they seemed attuned to learning more about agricultural opportunities, including chances to gain additional training.

In the perspective, participant’s also perceived the agricultural industry is a place where they could fit in. It was not viewed as an overly complex discipline. Instead, it was thought to be a place where they could find meaning (28, +5, 1.886). This belief was built upon an inherent affection and excitement for the industry. Therefore, they believed it was the truly the place they were meant to be (25, +4, 1.119).

Table 4

“Good Enough” Array Statements

No.	Statement	<i>Holistic Category</i>	<i>Z-scores</i>	Array Pos.
<u>Nine highest ranked “most like” statements</u>				
28	Working in agriculture means helping others.	Feeling	1.886	+5
27	I would feel successful in an agricultural career.	Feeling	1.771	+5
37	Agriculture allows me to work outdoors.	Doing	1.406	+4
26	Those close to me would support me in working in agriculture.	Feeling	1.181	+4

25	I would be proud to get a job in agriculture.	Feeling	1.119	+4
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Nine highest ranked “most unlike” statements

10	People in agriculture are different.	Creating	-1.943	-5
40	Agriculture is a very laboratory based career.	Doing	-1.938	-5
19	Agriculture involves solving complex problems.	Thinking	-1.401	-4
15	Agriculture is a challenging subject.	Thinking	-1.361	-4
9	Agriculture is very innovative.	Creating	-1.356	-4

“Most like” and “Most Unlike” highest ranked distinguishing statements

Most Like

27	I would feel successful in an agricultural career.	Feeling	1.771	+5
26	Those close to me would support me in working in agriculture.	Feeling	1.181	+4
25	I would be proud to get a job in agriculture.	Feeling	1.119	+4

Most Unlike

10	People in agriculture are different.	Creating	-1.943	-5
19	Agriculture involves solving complex problems.	Thinking	-1.401	-4
15	Agriculture is a challenging subject.	Thinking	-1.361	-4

Perspective C: New to Me

In the final perspective, five (two female, three male) sorters held the view that agriculture was a new, fresh concept (4, +5, 1.773). Therefore, these 14 to 17 year old individuals were experiencing the agricultural industry for the very first time. On first impression, they seemed to view agriculture as a creative discipline that would allow them to explore new areas (6, +5, 1.962). Therefore, getting involved in the agricultural industry might ultimately afford them the freedom to think outside of the box and create new knowledge (3, +4, 1.375). They believed could perhaps even make a meaningful impact in the world.

Sorters also seemed intrigued by the science embedded within the agricultural industry (20, +4, 1.186). This science focus appeared to challenge them intellectually and also allow them to think in new ways (16, +4, 1.611). Therefore, through their discovery of the discipline, they seemed to perceive that agriculture was a multi-layered field that was more complex than some might first believe.

Despite initial positive views of agriculture, however, participants remained unsure if it was an area in which they could get passionate about in the future (27, -4, -1.197). Further, they were uncertain if they would be able to fit in and feel self-confident in their abilities. The sorters also seemed to believe that an agricultural career might not allow them to find meaning in their work. Although the novelty of the field was intriguing to them, they were still undecided if the agricultural industry was the place they belonged (27, -4, -1.197).

Table 5

“New to Me” Array Statements

No.	Statement	<i>Holistic Category</i>	<i>Z-scores</i>	Array Pos.
<u>Nine highest ranked “most like” statements</u>				
6	Agriculture includes much more than people think.	Creating	1.962	+5
4	Agriculture is a place where all ideas are welcome.	Creating	1.773	+5
20	Agriculture allows me to think like a scientist.	Thinking	1.686	+4
16	Agriculture requires good thinking.	Thinking	1.611	+4
3	Agriculture allows me to think outside of the box.	Creating	1.375	+4
<u>Nine highest ranked “most unlike” statements</u>				
40	Agriculture is a very laboratory based career.	Doing	-1.945	-5
38	Agriculture involves really hard work.	Doing	-1.678	-5
18	People in agriculture are smart.	Thinking	-1.244	-4
27	I would feel successful in an agricultural career.	Feeling	-1.197	-4
37	Agriculture allows me to work outdoors.	Doing	-1.169	-4
<u>“Most like” and “Most Unlike” highest ranked distinguishing statements</u>				
<i>Most Like</i>				
6	Agriculture includes much more than people think.	Creating	1.962	+5
4	Agriculture is a place where all ideas are welcome.	Creating	1.773	+5
20	Agriculture allows me to think like a scientist.	Thinking	1.686	+4
<i>Most Unlike</i>				
38	Agriculture involves really hard work.	Doing	-1.678	-5
18	People in agriculture are smart.	Thinking	-1.244	-4
27	I would feel successful in an agricultural career.	Feeling	-1.197	-4

Conclusions, Implications, Recommendations, & Discussion

This study’s purpose was to understand the perceptions African American students held of careers in agriculture. Through the analysis of data, three perceptions emerged: (a) Not Me, (b) Good Enough, and (c) New to Me.

The first position, held by 11 sorters, maintained the view that careers in agriculture were not in their future. This position seemed to align with much of research on the career plans of African American students (Anderson & Kim, 2006; McWhirter, 1997). It is possible that these students see agriculture as outside of their

zone of acceptance and thus might simply not be interested. Despite not wanting to be part of the industry, however, they were positive about agriculture and saw it as a very innovative career, which aligns with Jones and Larke's (2001) findings. Moving forward, more work is needed to help individuals sorting in the Not Me perspective to better understand the opportunities available in agriculture. Although researchers (Jones & Bowen, 1998; Larke & Barr, 1987; Talbert & Larke, 1995; Warren & Alston) have made similar calls over the past two decades, little progress seems to have been made. We must consider the answer to the lack of diversity is more complex than, "Minorities do not like it." Defining sorts from this perspective expressed they did not currently feel comfortable in agricultural environments. Perhaps we should refocus our recruitment efforts to make sure that we are highlighting agricultural career opportunities available where African Americans students live and socialize.

Five sorters held the Good Enough perspective, and as such, were considering a career in agriculture because they believed it was an honest industry that valued hard work. This aligns with current literature (Byler, 1987; Fisher & Griggs, 1994; Shipp, 1992). Sorters also felt as though they were able to fit into the agricultural industry by gaining a sense of community (Shipp, 1992). Interestingly, Westbrook and Alton (2007) suggested that many minorities that feel comfortable in an agricultural context were members of youth agriculture organizations. However, participants in this study did not have a major role in 4-H or FFA. Therefore, future research is needed to identify what factors promoted a sense of belonging to the agricultural industry. Community partners that related well and have relationships with the students directed the REYAP program rather than university faculty seeking to find and then recruit. This grass roots effort built on relationships seemed to be effective in propagating a positive perception and sense of belonging in agriculture. Perhaps more deeply understanding emotional and perceptual identities would provide much needed data for the agricultural industry regarding this discrepancy.

The view that agriculture is New to Me was expressed by five (two females, three males) participants. They seemed to hold a positive view of agriculture. Further, they believed the industry was science and technology driven. It seems that the REYAP program provided an avenue for students new to agriculture to be encouraged to consider the profession from within cultural structures (Westbrook & Alston, 2007). Therefore, we recommend that purposeful recruitment measures be taken to emphasize important cultural and social associations for individuals that are unfamiliar with the agricultural industry. Perhaps if individuals feel comfortable as they learn about agricultural concepts they will be more open to pursuing an agriculturally related career. It appears that the REYAP program was effective in developing an initial positive view of agricultural careers. However, those defining this perspective have not made any commitment to enter agriculture, but rather are still watching and judging from afar. How do we build on this initial interest and strengthen their commitment. It seems the most appropriate approach is relationship building from those within their existing social circles.

It is essential that research continue to explore the impacts of programs such as REYAP. Where are these students now? Did those who saw agriculture as a viable option persist in that opinion? Why or why not? Also, did agriculture eventually recruit those who were interested but needed more affirmation?

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Perceptions of Agricultural Leadership Academic Programs of 1862 Land-Grant Universities

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Abstract

This study characterized perceptions of agricultural leadership programs in colleges of agriculture, food, life, human, or environmental sciences at 1862 land-grant institutions. Twenty-six academic programs were identified with a major, minor, graduate degree, specialization, concentration, or certificate in agricultural leadership. Programs were identified through the APLU and USDA NIFA databases, searching academic college websites, and contacting various deans and departments heads. Objectives included identifying programs, describing the need for programs, studying evolution within the discipline, discussing faculty recommendations for future development, and examining why programs are relevant. Qualitative data were analyzed using thematic analysis, which included open and axial coding. Furthermore, nineteen respondents completed the interview. Agricultural leadership was formed from a need in the agricultural industry but holds roots in agricultural and extension education. The discipline evolved because of a being broadly appealing, as well as growing through the expansion of community and rural leadership development. Faculty recommended collaborative efforts across the discipline through establishing a professional organization, but also indicated a unified vision was imperative for growth. Participants were asked about the outlook of the field and foresaw growth nationwide. When referencing the relevancy of agricultural leadership's role in academia, two themes emerged: a) agricultural leadership creates leaders through developing "human capital," and b) graduates promote industry growth through their political, policy, and public influence. Results aligned with research indicating the discipline should be analyzed to promote a unified vision for sustainability. This vision includes collaboration to establish a set of standards and proficiencies to prepare students for roles as industry leaders. Future recommendations for research included identifying perceptions of agricultural leadership beyond the scope of 1862 land-grant institutions.

Introduction

Agricultural leadership programs have roots at land-grant universities within agricultural education departments, but have shifted from primarily educating rural youth to educating undergraduate and graduate students on becoming empowered community members (Velez, Moore, Bruce, & Stephens, 2014). As early as 1989, the Strategic Plan for Agricultural Education suggested there was a need to "amplify and expand the whole person concept of education, including leadership" (National Summit on Agricultural Education, p. 4). Brown and Fritz (1994) indicated leadership courses and programs offered by departments of agricultural education are well-received by faculty and students and continue to climb in both stability and growth. Many higher learning institutions have exhibited a strong commitment to promoting leadership development programming and prepare professional and societal leaders for future generations (Astin & Astin, 2000).

Identifying historical structures and current realities shaping perceptions of agricultural leadership programs is imperative to understanding how to lead these programs into the future (Williams, Townsend, & Linder, 2005). However, while agricultural leadership programs enjoy success, there is a lack of research on program objectives, courses offered, perceptions of programming, placement of graduates, and need for programs (Morgan, King, Rudd, & Kaufman, 2013). Understanding how leadership develops in differing cultures,

programs and organizations is of utmost importance to understand the overall context of leadership programming (Nahavandi, 2006).

The American Association for Agricultural Education (AAAE) and the Association of Leadership Educators (ALE) both produced national research agendas that encompass areas important for agricultural leadership programs. The National Research Agenda (Doerfert, 2011) Priority 5: Efficient and Effective Outcomes addresses the needs to develop effective academic programs to advance the career, developmental, and academic needs of diverse learners. Additionally, Priority 6: Vibrant, Resilient Communities addresses the need for communities to have trained leaders to ensure the opportunities for educational and career development experiences for community members. The National Leadership Education Research Agenda developed research priorities to assist in guiding a more structured approach to understand and teach leadership (Andenoro, et. al., 2013). The NLERA research priorities are contained in four primary areas, (a) teaching, learning and curriculum development; (b) the psychological development of leaders, followers, and learners; (c) the sociological development of leaders, followers, and learners; (d) social change and community development; and (e) global and intercultural leadership (Andenoro et al., 2013). Leadership research within the agricultural education context needs to explore priorities of future research, training, student development, and program growth (Spotanski & Carter, 1993).

Kaufman, Rateau, Ellis, Kasperbauer, and Stacklin (2010) suggest more research must be conducted to clarify the understandings and benefits of agricultural leadership programming. Further qualitative study should be conducted to include known leaders within the field to better understand knowledge of the discipline (Williams, Townsend, & Linder, 2005). By soliciting input from agricultural leadership experts, one might better understand career focus and placement for graduates, objectives of programming, courses taught related to agricultural leadership, and perceptions held by associates within the discipline (Morgan et al., 2013).

There were two theories that guided the development of this study including Ajzen's Theory of Planned Behavior and Bloom's Taxonomy. Ajzen's Theory focusses on intentions that represent the motivations of an individual in relation to his or her conscious plans or decisions to begin a certain behavior (Ajzen & Madden, 1986). Therefore, the Theory of Planned Behavior has experienced a high degree of success in predicting varieties of behaviors and serves to create effective design decisions to produce changes in behaviors.

Jago (1982) identifies "harder" sciences, such as chemistry, physics or biology, easier to characterize based on "laws" which govern a particular phenomenon, while "softer" sciences such as human behavior or interaction remain imprecise or inexact because of the complexities of human emotion. Bloom's Taxonomy is popular among many academic disciplines as a form of understanding how people learn or master a given subject in a process. Krathwohl (2002) identifies Bloom's Taxonomy as a useful framework when working to better understand the intended expectations of students and what they might learn as a result of the instruction.

While qualitative studies are often rare in the leadership discipline because of being time intensive and complex, these types of studies are optimum for understanding perceptions related to leadership development programming (Conger, 1998).

Purpose and Objectives

The purpose of this study was to identify and characterize the current agricultural leadership academic programs in colleges of agriculture, food, human, life or environmental sciences at the undergraduate and graduate levels. The study encompassed programs which offered certifications, specializations, concentrations and options focused in agricultural leadership. Four research objectives guided the study, which included:

Describe the need for the development of agricultural leadership programs at land-grant universities;
Describe agricultural leadership's discipline-wide evolution regarding curriculum, training, teaching practices, and courses offered;
Describe faculty members' recommendations on what should be developed or changed to holistically advance curriculum and update programming efforts within the field for future improvement and growth of agricultural leadership programs; and,
Examine why faculty believe agricultural leadership-related programs are relevant by also analyzing their outlooks for the future of the discipline.

Methods

There are fifty 1862 land-grant institutions with a college related to agriculture, food, life, human, or environmental sciences (APLU, 2015). Each college's website was searched for an undergraduate or graduate degree, specialization, concentration or option in leadership. Each university that offered programs where students could receive academic credit for a program related to agricultural leadership were contacted (N=26). Of the 26 identified schools, 22 schools agreed to participate in the study and provided names of faculty working in an agricultural leadership program for the interview. Initial permission was obtained from department heads or administrative deans in the colleges to administer a survey and follow-up interview of an agricultural leadership faculty member at their institution. Faculty members in colleges of agriculture who have taught leadership courses, advised graduate and undergraduate students, and created leadership curriculum were purposely selected as the target population. Three institutions declined to participate in the study and three individuals did not schedule an interview. This provides 76% (n=19) response rate of institutions that participated in the interview.

Telephone interviews were conducted with the leadership faculty members at a convenient time identified by the faculty. The IRB approval of data collection included the survey, interview questions and sample script. Before conducting the interview questions, faculty members were emailed the interview questions. Qualitative methodologies are integral in collecting data for developing a more complex understanding of a specific topic rather than a generalized, broad perception (Patton, 2002). Therefore, qualitative methods allow the researcher to conduct research in a natural fashion so both data and themes emerge with detail, thus leading to a richer research experience. Conger (1998) suggests there has been a long-standing assumption in the social science fields that qualitative research plays the greatest role in the exploration of a given research topic such as leadership.

Interviews offer a technique where insights into a given culture, group, or organization can be better understood through the interpretation of qualitative data (Hertz & Imber, 1995). Because each interview is linguistic, social, and psychological, each participant and researcher experience will be vastly different based on the numerous unforeseen environmental factors, which might occur throughout the research process (Anderson & Jack, 1991; Glesne, 2006).

Triangulation was achieved by using various methods to record each interview including recording devices and extensive notetaking during the interview. Each interview was recorded and saved to a computer with an assigned number based on the interview order. After each interview was transcribed, the researcher emailed a copy back to each faculty member to check for accuracy and clarity (Glesne, 2006). Each interview participant (n=19) was given a label, which corresponded to the order in which they completed their interview. For example, the first respondent would be represented as "F1."

The words and phrases were clustered into categories to find patterns that align with excerpts of like meanings and opinions. The researcher employed both open and axial coding in the study. According to Creswell (2007),

open coding is the first step in the data analysis process and involves segmenting interview transcriptions into themes or categories of specific information, while axial coding is the step which follows open coding where researchers take the identified themes drawn from open coding and create a central phenomenon to better understand what influenced or caused these segmented pieces of information to take place.

Findings/Results

There are 25 land-grant institutions with agricultural leadership academic programs housed in a college of agriculture, food, life, human, or environmental sciences. The leadership programs have faculty members who serve in various roles such as department head, program coordinators, assistant, associate, and full professors. Specifically, the researcher's sample included one instructor, eight assistant professors, three associate professors, and seven professors of which five were female and 14 were male.

Creation of Agricultural Leadership

Two major themes emerged regarding the growth of the agricultural leadership programs: a) direct connection to agricultural and extension education, and b) need for leadership skills in the agricultural industry.

Regardless of the structure and organization of each faculty respondent's academic department, respondents indicated the agricultural leadership discipline draws strong roots from both agricultural and extension education. Six respondents (F2, F4, F7, F15, F16, F17) discussed agricultural leadership as a discipline created on the coat tails of agricultural and extension education when senior faculty members identified a need to better train teacher educators and extension agents for their respective fields. Respondent F17 stated "as a land-grant university, obviously, we are a supply stream of extension agents, so the degree was created..." Further echoing that sentiment, respondent F15 indicated agricultural leadership, at her institution, was promoted to students who were studying teacher preparatory programs, but later decided they didn't want to teach secondary agricultural education.

A second major theme (F1, F3, F8, F10, F13, F18) revealed agricultural leadership saw implementation and growth because of increasing demands from agricultural industry professionals. They expressed the need for graduates to possess a more diverse set of "soft" skills such as leadership, communication, organization and development. F18 suggested graduates lacked a set of structured soft skills or understanding of leadership and personal development. "Overall, agricultural leadership was created here at Oregon State because the feedback we got over and over again indicated our graduates were technically competent, but really needed those skills on how to work with others and step up as a leader" (F18). Furthermore, the development of some agricultural leadership programs was the direct result of industry leaders approaching college administrators.

The agricultural industry leaders from across North Carolina came to the dean of the College of Agriculture and Life Sciences here at North Carolina State, and specifically told him that NCSU was doing an exceptional job of teaching content matter to our graduates, however, industry research found a need for students to have more 21st century leadership type skills. (F8)

Evolution of a Discipline

Since the creation of the discipline of agricultural leadership, respondents cited the need to establish competencies and an overarching purpose for the discipline.

A majority (n=10) of faculty respondents indicated agricultural leadership has evolved in terms of maturity, definition and growth. The respondents (F1, F4, F7, F8, F9, F10, F12, F13, F14, F15) articulated how

agricultural leadership has matured in a broad sense by reinforcing skills from other areas of agriculture. These faculty respondents noted that agricultural leadership curriculum not only promotes leadership education, but also the necessity of learning other skills such as communications, economics and agricultural policy.

Additionally, respondents F4, F9 and F14 all spoke of agricultural leadership serving the closest to what was once a general agriculture degree at many universities. For example, F9 said, “agricultural leadership is great for the student who knows exactly what they want to do, or also great for those who have no idea about what they want to do.” Moreover, agricultural leadership programs are appealing to a wide variety of students from a variety of disciplinary areas (F14). For example, a leadership minor pairs well with a degree in business, education, or even engineering as it allows students to further develop soft skills to succeed in their given profession.

Respondents F2, F5, F6 and F17 articulated the need for consistency in curriculum nationwide. For example, core courses required of agricultural leadership programs should be similar. This could include courses pertaining to personal leadership development, leadership theory, ethics, and team and organizational leadership. While curriculum among programs still varies, there has been a shift among programs to offer a more standardized curriculum. “There is more structure [in agricultural leadership] than there was 10 years ago, 15 years ago, or 25 years ago. What I am talking about is a sense of organization to what agricultural leadership actually is” (F2). The movement towards a more standardized approach to agricultural leadership can be evidenced by the creation of the National Leadership Education Research Agenda (NLERA) (F5). The NLERA has not only established target research areas for leadership education but promoted collaboration among agricultural leadership faculty (F5).

Recommendations for Growth

Two main themes were determined regarding question three soliciting recommendations for future growth and improvement. These themes centered on 1) collaboration with faculty across the discipline and 2) a lack of future vision and purpose for the discipline.

Regarding collaboration, 10 faculty respondents (F1, F2, F4, F5, F6, F7, F9, F14, F15, F17) referenced the need for more collaboration among faculty members across the country to create cohesiveness throughout the discipline, share ideas for teaching and research, and to promote and publicize the importance of agricultural leadership. One individual (F5) suggested collaborating outside the discipline to better understand the concepts, ideas and structures that work alongside agriculture. Specifically, respondent F5 gave an in-depth answer regarding the importance of this issue.

If we don't look at the varying systems that interact with agriculture such as nutrition, climate change, energy consumption, etc., we cannot be effective. The biggest thing we can do for our discipline, and especially our world, is to collaborate with other disciplines because leadership in itself is an inter-disciplinary discipline. (F5)

Respondents advocated the need for a professional “home” organization, where agricultural leadership educators could meet to discuss ideas and promote their agenda (F2, F7, F9, and F15).

There's no single place [organization] that has risen to bring people who do agricultural leadership and agricultural leadership education together. I think about things like AAEE (American Association for Agricultural Education), and I don't think these organizations serve agricultural leadership folks the way it could because it focuses on agricultural education. All of the professional organizations in agricultural communications might serve us, but they aren't (F2).

Respondent F9 indicated “agricultural leadership faculty members exist on their own due to the lack of a designated professional organization. There’s not a driving force to do professional development and everyone has to seek their own opportunities”. Another respondent (F15) talked about the need to create open dialogue to share ideas, stories, and experiences. “Having this [platform] would help our discipline so much. I don’t think we have a great platform to do that because not everyone goes to ALE or AAAE, so we [agricultural leadership] don’t really have a place where we can gather as educators...” (F15). Additionally, F2 and F7 both made comments about the Association of Leadership Educators (ALE) potentially filling this void. However, both respondents felt ALE had a broad leadership focus instead of agricultural leadership. Moreover, four respondents (F2, F7, F9, and F15) stressed the importance of identifying a professional development home for the agricultural leadership discipline.

Another theme regarding recommendations for future growth and development emerged. Eight faculty members (F1, F2, F4, F5, F6, F14, F15, F17) discussed the importance of creating a set of standardized key elements that should be standard in agricultural leadership programs in terms of course work, curriculum, theory, research and hands-on learning. For example, one respondent (F4) discussed how their institution created a task force to define key elements critical to the success of an agricultural leadership program. The ending result was the evolution of seven program competencies including leadership and motivation theory, communication skills, change management, conflict management and resolution, team and collaborative leadership development, policy formation, and service/experiential learning opportunities (F4). Other respondents (n=6; F1, F4, F6, F9, F12 and F15) also talked about components present in their agricultural leadership programs including capstone courses, internships, international opportunities, research experiences (at both the undergraduate and graduate level), and service learning opportunities.

Future Outlook

Question four solicited faculty respondent’s future outlook for agricultural leadership. Several themes related to sustainability through collaboration and connectedness among professionals, implementation of clear, standardized competencies to be disseminated to students through coursework, and finally, a much larger presence of experiential learning opportunities.

Faculty members’ opinions varied significantly in how the discipline would grow, but the majority (n=13) (F1, F2, F3, F5, F6, F7, F8, F12, F13, F14, F15, F16 and F17) believed agricultural leadership would grow in some capacity. For example, faculty members F7, F13, F14 and F17 each indicated agricultural leadership will experience an influx of students at institutions because of an increased awareness from industry professionals regarding the validity of agricultural leadership. “It [agricultural leadership] allows students within the college [of agriculture] or outside the college to take classes to help develop their leadership skills” (F1). Moreover, respondents cited students recognizing the value of obtaining skills learned in an agricultural leadership program.

I talk to a lot of perspective students who are passionate about the industry and recognize a need to better communicate and educate the population about the importance of the agricultural industry. I think with that taking place, the agricultural leadership major is a great place to really capture that enthusiasm and build that skill set to accomplish the goals being set forth by industry (F13).

Additionally, an influx of student enrollment in agricultural leadership courses could foster the creation of new agricultural leadership faculty positions (F7). “As you look at the jobs that are opening up across institutions nationwide, often times, they’re in leadership, and I think that it will just continue to grow as people see our graduates making huge impacts in the industry by bringing new skills to the table that they’ve learned in our classroom” (F7).

Relevancy of Agricultural Leadership

The most notable theme expressed among faculty members related to relevancy of agricultural leadership programming (F3, F4, F5, F7, F12, F13, F17) was the idea of creating leaders within communities and rural settings and the agricultural industry. Specifically, F3, F4 and F5 discussed the necessity of agricultural leaders being useful in the political arena by working to influence lawmakers and agency officials to favor agricultural issues. Mimicking those feelings were faculty members F7, F12, F13 and F17 who articulated agriculture leaders as being well-versed about agricultural issues, and having the ability to educate the general public about circumstances and issues facing the industry. “We’ve got to have those people at the forefront who are well-versed on how to get a group of people moved toward a common goal.” (F7)

A number of faculty members attributed the relevancy of agricultural leadership to its students and graduates serving as high quality leaders. This is due to the ability of agricultural leadership programs harnessing “human capital in modern organizations” (F2). Faculty respondents F2, F10 and F15 described the development of human capital through the wide variety of programming areas that take place in agricultural leadership academic programs. The respondent explained that a study recently conducted by the American Association of Universities said, “most employers are struggling because the students they’re wanting to hire don’t have soft skills such as critical thinking, communications and leadership, and we’ve been doing that all along” (F15). Further solidifying F15’s statements were F2 and F10 when they reported agricultural leadership remains relevant and sustainable by developing leadership capacities in students with personal development, team development and organizational development competencies.

A final theme related to agricultural leadership’s relevancy was shared by faculty members F1, F8, F9 and F16 who described agricultural leadership as a broad area with a unique ability of appealing to a wide variety of individuals. F16 indicated agricultural leadership ties together scholarship with leadership and citizenships skills to cultivate credentialed programming students enjoy. Additionally, agricultural leadership equips students to succeed in the real world.

I think it [agricultural leadership] is really a wide variety of 21st century skills in being able to collaborate, communicate, critically think and creatively think that our whole industry needs. Any industry is going to teach you exactly what you need to know once you are hired, but I think those four C’s I mentioned are what employers are looking for. If you can elaborate on those and effectively communicate your skillset and what you offer to that company, our students will always be in demand, continue to get good paying jobs, and advance up the corporate ladder in the professional world (F8).

F1 echoes the statement by suggesting agricultural knowledge coupled with leadership skills and knowledge helps the discipline to grow because of the wide skill set that is applicable in any student’s “toolbox.” Making a final case for that outlook is faculty F9 who stated “we won’t prepare you [student] narrowly in one area, but we will prepare you [student] more broadly in multiple areas, so they [students] don’t have trouble finding jobs because they’re prepared for a number of areas.”

Conclusions and Recommendations

The purpose of this study was to identify and characterize current agricultural leadership academic programs in colleges of agriculture, food, human, life or environmental sciences at the undergraduate and graduate levels. Furthermore, the study sought to gain perspective for future recommendations from leaders within the agricultural leadership discipline. A thorough web search of 1862 land-grant institutions identified 25 institutions with leadership programs hosted in the college of agriculture, food, life, human or environmental

sciences. Interviews were conducted with 19 respondents, including 14 males and 5 females. Respondents were mostly faculty members and included 7 professors, 3 associate professors, and 8 assistant professors as well as one instructor.

Based on the findings of this study, it can be concluded the discipline of agricultural leadership has roots in the disciplines of extension and agricultural education. Originally, the discipline served as a program for students who did not want to teach agricultural education or become extension educators but rather wanted to go into other agricultural professions. Respondents compared the discipline to a general agricultural degree. However, further evolution of the discipline was driven by industry demands, in which employers complained students had content knowledge but were lacking in soft skills (Morgan, et al., 2013). Therefore, the demands of the agricultural workforce have deemed the importance of students developing leadership skills (Valez, et al., 2013). Today, agricultural leadership programs are able to fill the gap by cultivating a skilled and knowledgeable agricultural workforce who also possess desired soft skills such as leadership, communication, organizational and team development.

Since the creation of the discipline, there has been a lack of efforts to establish discipline standards and competencies. Therefore, agricultural leadership programs lack consistency in curriculum, skill sets, and research focus from one institution to another. This could be a result of a lack of efforts to establish cohesiveness and foster collaboration among agricultural leadership faculty. Many respondents cited the lack of a professional home organization, such as AAEE, for the discipline. Similar results were indicated by a study conducted by Valez, McKim, Moore, and Stephens (2015) which found agricultural leadership faculty felt they had minimal to moderate support from AAEE in regards to professional development and research endeavors. Moreover, respondents cited ALE as a professional organization with an emphasis in leadership but cited the organization did not fully fulfill the needs of agricultural leadership educators.

The lack of a professional development organization dedicated to agricultural leadership could contribute to the absence of consistency among agricultural leadership programs. Currently, there are not established key competencies for agricultural leadership programs. The development of key competencies would impact courses offered, experiential learning opportunities, and theories infused into the curriculum. Respondents cited a need for opportunities to collaborate on curriculum development, course work, and research opportunities to create cohesiveness throughout the discipline. Establishing consistency among programs is important as agricultural leadership faculty are working to educate future leaders within the agricultural industry (Valez, et al., 2013).

The findings revealed respondents expect the agricultural leadership discipline to continue to grow in course offerings, student numbers, graduate programs, and creation of faculty positions. The growth of agricultural leadership programs could be related to industry demand for a skilled, educated workforce who possess soft skills (Morgan, et al., 2013). Growth in student numbers could also be related to the interdisciplinary nature of agricultural leadership programs where majors, minor, concentrations, certificates and specializations pair well with other programs such as business, education, and engineering. However, it should be cautioned that agricultural leadership programs as a discipline should develop an overarching vision and plan for continued growth to ensure the discipline retains the faculty, infrastructure, and professional development support needed to remain viable within academia (Valez, et al., 2015).

Based on the conclusions of this study, future recommendations should be made to provide further exploration in the discipline in agricultural leadership. Specifically, it is interesting to note there were few (n=3) respondents with the rank of associate professor. Instead respondents were either assistant professors (n = 8) or professors (n=7). Additionally, respondents were predominately male (n = 14) with only five female respondents in the study. A complete study analyzing the demographics of agricultural leadership faculty should

be conducted to provide a scope of the discipline. Questions could include title, gender, years teaching agricultural leadership, educational background, courses taught, and research focus.

As the discipline continues to grow, leaders within the discipline should work to establish a professional development organization dedicated to agricultural leadership. The need for organized professional development opportunities for agricultural leadership faculty is growing (Velez, et al., 2015). A professional development organization could work to establish key program competencies, foster opportunities for sharing ideas, create collaboration efforts to improve research, and develop faculty partnerships to collaborate on grants. Additionally, the creation of such organization would ensure provide agricultural leadership faculty with professional development needed to ensure high quality leadership programs.

While this study focuses on faculty perceptions about the discipline, future studies should be conducted to determine student perceptions, including present and past students, of agricultural leadership programs. Specific exploration should focus on key concepts and skills learned through course work, perceived levels of faculty preparation, experiential learning opportunities provided, and job placement post-graduation. A student focused study would assist faculty by identifying specific areas of improvement needed within the discipline while providing insight to student needs.

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A Theory Based Model of Interpersonal Leadership for Use in Agricultural Leadership Education

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Abstract

Although the term interpersonal leadership has been well established within the literature there remains a dearth of theoretical derived models that specifically address the comprehensive nature of the underlying leader behaviors and activities. The intent of the present article was to attempt to synthesize the existent leadership models, behaviors, and factors to arrive at a coherent conceptual model of interpersonal leadership to inform efficient and effective agricultural leadership education programs. The resulting model included 13 primary factors integrated within a hierarchical framework. Agricultural educators are recommended to adopt or adapt the proposed model while developing educational curriculum and interventions.

Introduction

At the most fundamental level, leadership requires an interaction between at least two individuals (Northouse, 2013). For much of human history, leadership at an interpersonal level was all that was required to exert influence or provide leadership within the agriculture and natural resources area (Diamond, 1999). In more contemporary society, there has been an ongoing need for agriculture and natural resource professionals to be able to effectively work on an interpersonal level (Rogers, 2003). Consequently, effective leadership, and an ability to navigate a changing environment, require an ability to work with others and exert competent interpersonal leadership (e.g. Goleman, Boyatzis, & McKee, 2002; Kouzes & Posner, 2010).

For example, although there are differing opinions on the source of the global climate change phenomenon, the empirical evidence indicates there is a measurable change underway (e.g. Englander, 2012; Gillis, 2014). The impacts to the agricultural and natural resources industries could be wide ranging. Specifically, “documentation of locally adapted varieties and breeds of crops and livestock are poorly documented and may be lost before their potential roles in climate change adaptation are recognized” (UN, 2015, para. 8). The ability for agriculture and natural resources leaders to act as change agents and establish the appropriate information exchange relationships with their peers is critical to stemming the loss of potentially valuable biodiversity data (Rogers, 2003; UN, 2015).

Leadership “is a process whereby an individual influences a group of individuals to achieve a common goal” (Northouse, 2013, p. 5). The interaction between leader and each respective follower therefore represents the constituent unit of leadership (Bass, 2008). Accordingly, “interpersonal competence involved the ability to communicate and to demonstrate, caring, insight, and empathy. Effective leaders needed to sense the needs of their followers and point out ways to fulfill them” (Bass, 2008, p. 135).

Previous research has examined specific leader traits (e.g. Lord, De Vader, and Alliger, 1986) as well as leader personality traits predicting specific leader behaviors or outcomes (e.g. Judge & Bono, 2000; Judge, Bono, Illies, & Gerhardt, 2002) in addition to specific leadership behaviors related to follower outcomes (e.g. MacKenzie, Podaskoff, & Rich, 2001). However, the literature has lacked a synthesis of existing leadership theories or models as they specifically relate to interpersonal leadership behaviors.

According to the National Research Agenda: American Association for Agricultural Education 2011 – 2015 priority area five identifies the need for efficient and effective agricultural education programs (Doerfert, 2011).

The purpose of the current article was to develop a theoretically derived model of interpersonal leadership based on a comprehensive synthesis of the existing literature for use in agricultural education settings.

Leadership Classification Systems

According to Bass (2008), “A simple model of leadership may be a list of different types of leaders grouped according to one or more characteristics about them. Taxonomy classifies them according to their mutual relationships, similarities, and differences” (p. 27). The use of theoretical leadership constructs or specific models of leadership to represent a set of leader behaviors or competencies have been employed extensively (Bass, 2008; Northouse, 2013). The use of classification terms such as taxonomy, theory, and model must therefore be considered within a context in which the intended purpose of the proposed construct need not fulfill certain requirements for classification (e.g. Cheetham & Chivers, 1996), but rather fulfill a need to describe a certain phenomenon (Bass, 2008).

Numerous researchers have sought to establish a taxonomy, theory, or model based approach within which to classify leader behaviors, competencies, or outcomes (e.g. Bass, 2008). “Lacking a taxonomy of this sort, it seems unlikely that substantial progress can be made in the construction of leadership development programs and the generation of more effective models for understanding leader performance” (Fleishman et al., 1991, p. 246).

Based on the research of Fleishman, Mumford, Zaccaro, Levin, Korotkin, and Hein (1991) and their syntheses of the existent contemporary leadership literature four superordinate level categories were identified: information search and structuring, information use in problem solving, managing personnel resources, and managing material resources. The researchers then identified groupings of leader behavior, or competency, dimensions nested under each of the superordinate dimensions (Fleishman et al., 1991).

More recently Yukl, Gordon, and Taber (2002) completed a similar synthesis identifying the primary leadership behavior, or competency, categories and associated constituent components. The researchers identified three meta-categories of leader behavior or competencies: task, relations, and change. Similar to previous researchers (e.g. Fleishman et al., 1991) the researchers identified more discrete groupings of leadership behavior within each of the broader meta-categories (Yukl et al., 2002).

Within the broader context of leadership behavior taxonomic approaches Bass (2008) identified nine broad behavioral categories: understanding, caring, and consideration for others, communication competence, fostering and maintaining good relations, managing conflict, delegating and empowering, fostering happiness, promoting collective decision making, and personal attributes.

An extension of the taxonomic approach has been to also categorize leadership theories or models according to behavioral category level similarities, acknowledging that constituent parts of models and theories may not readily reside in only one category (Bass, 2008). For example, the individualized consideration component of transformational leadership may exist simultaneously at an individual, group, or organizational level it is the intent of the interpretation that is most germane (Avolio & Bass, 1995).

An integration of the existent taxonomic research (Bass, 2008; Fleishman et al., 1991; Yukl et al., 2002) produced 24 thematically independent behavioral categories. The resultant categories were then aligned to a hierarchically appropriate level of leadership according to the original researchers intent. In particular, levels of leadership were developed by synthesizing and thematically grouping previous taxonomic approaches available within the literature (Bass, 2008; Fleishman et al., 1991; Yukl et al., 2002).

Interpersonal Leadership

According to previous research and classification systems, the following behavioral categories were identified to guide a thorough analysis of the interpersonal leadership literature: understanding, caring, and consideration for others (Bass, 2008), communication competence (Bass, 2008), fostering and maintaining good relations (Bass, 2008), managing conflict (Bass, 2008), delegating and empowering (Bass, 2008; Yukl et al., 2002), fostering happiness (Bass, 2008), promoting collective decision making (Bass, 2008), personal attributes (Bass, 2008), developing others (Fleishman et al., 1991; Yukl et al., 2002), recognizing others (Yukl et al., 2002), motivating others (Fleishman et al., 1991), encouraging innovative thinking (Yukl et al., 2002), and supporting others (Yukl et al., 2002). The existent taxonomic approaches were used as a grouping schema in a review of the literature. Resultant themes were grouped according to taxonomic category.

Personal attributes

The personal attributes of a leader and the nature of the directionality between traits and leadership have been well researched (e.g. Bass, 2008). There has even been an implicit attribution of leadership (Lord & Maher, 1991) proposed. However, there are a number of recurrent themes. One of the primary themes has been that a leader must be a model for their followers (Bass & Avolio, 1990; Burns, 1978; Har-Evan, 1992; Hunt, Boal, & Sorenson, 1990; Kouzes & Posner, 2002). For example, the idealized influence factor of transformational leadership has specifically identified the need for a leader to act in a manner in which their follower may emulate (Bass & Avolio, 1990).

One of the areas in which a leader is expected to act as a model has been in their demonstration of ethical, moral, and value based judgments (George, 2003; Liden, Wayne, Zhao, & Henderson, 2008; Walumbwa, Avolio, Gardner, Wernsing, & Peterson, 2008). Given that leaders have been expected to act as change agents (Javidan & Dastmalchian, 1993; Schein, 1995), and to take action (Winter, 1978) within their areas of influence the need for self-awareness is paramount (Mumford, Zaccaro, Harding, Jacobs, & Fleishman, 2000; Walumbwa et al., 2008; Whitehead, 2009). A lack of leader humility (Van Dierendonck & Nuijten, 2011; Wong & Davey, 2007) has also been associated with an overly authoritative (Har-Evan, 1992) or even autocratic (Bass & Farrow, 1977; Reddin, 1977) approach to leadership.

Given that leaders must also serve as a symbol for their followers or cause (Bolman & Deal, 1991; Mintzberg, 1973) it has also been established that they require intelligence (Mumford et al., 2000), expertise (Barbuto & Wheeler, 2006; Wilson, O'Hare, & Shipper, 1990), and professional competence (Shrivastava & Nachman, 1989; House, 1977). Additionally, leaders must have the confidence (House, 1977; Luthans & Avolio, 2003) and courage (Van Dierendonck & Nuijten, 2011) to act given their role.

Leadership typically occurs within a complex and dynamic environment (Van Wart, 2003), consequently a leader must have command of multiple capacities to help span perceived boundaries (Hitt, Middlemist, & Mathis, 1983) and respond to requirements accordingly (Sayles, 1981). Frequently within the complexity of the context, the ability to lead others has required persuasion (Greenleaf, 1970; Har-Evan, 1992; Kirk & Shutte, 2004; Stogdill, Goode, & Day, 1962) and adaptability (Heifetz, 1994; Lord & Maher, 1993; Luthans & Avolio, 2003). Additionally, previous research has found that leaders must harness the ability to act in a politically appropriate manner (Beckhard, 1995; Birnbaum, 1988; Bolman & Deal, 1991) while balancing the needs to act entrepreneurially (Cribbin, 1981; Lord & Maher, 1993) in securing the resources necessary for success (Terry, 1993).

The personal attributes of leaders have also included the ability to act in an authentic (Luthans & Avolio, 2003; Terry, 1993; Van Dierendonck & Nuijten, 2011) manner, demonstrating honesty (Craig & Gustafson, 1998; Velasquez, 1992), self-discipline (George, 2003), and trust (Dennis & Bocarnea, 2005; Graen & Uhl-Bien,

1995). Furthermore, previous research has identified leader behaviors such as stewardship (Barbuto & Wheeler, 2006; Sendjaya, Sarros, & Santora, 2008), benevolence (Velasquez, 1992), and defenders of followers (Lord & Maher, 1993).

Communication competence

Communication has been identified as one of the primary predictors of emergent leadership (Northouse, 2013). Additionally, communication has also been identified as a predictor of success within established or assigned leadership as well (Bass, 2008). Previous research has established that communication competence has been a necessity for effective leadership (Luthans & Lockwood, 1984; Van Fleet & Yukl, 1986; Wilson et al., 1990).

Effective leaders have been shown to be skilled in communication skills (Olmstead, Cleary, & Salter, 1973; Stogdill & Shartle, 1955) including communicating information upwards (Hemphill, 1950; Wilson et al., 1990) as well as disseminating information down to followers (Israel, Schulz, Parker, & Becker, 1998; Jacobs, 1983; Van Fleet & Yukl, 1986). The exchange of information has been found to be paramount to a leader's success (Fine, 1977; Luthans & Lockwood, 1984).

Leaders have also been found to seek (Metcalf, 1984) and process (Hitt et al., 1983; Olmstead, Cleary, Lackey, & Salter, 1976) information through listening (Greenleaf, 1970) and other acquisition methods (Olmstead, Baranick, & Elder, 1978). Once obtained leaders clarify information (Yukl, 1998) to facilitate appropriate implementation (Farr, 1982; Jacobs, 1983).

Supporting others

In their research, Yukl, Gordon, and Taber (2002) defined supporting as, "showing consideration, acceptance, and concern for the needs and feelings of other people" (p. 20). Several researchers have indicated that one of the primary responsibilities of a leader has been to provide support to their followers (Hersey & Blanchard, 1969; House & Mitchell, 1974; Yukl, 1998).

Leaders that serve their followers have been seen as more accountable (Van Dierendonck & Nuijten, 2011) with higher levels of obligation (Graen & Uhl-Bien, 1995) and public-spiritedness (Velasquez, 1992). Leaders that support and serve their followers have also been found to be more effective in helping those followers solve problems (Shultz, 1961) and through the process provide developmental opportunities (Van Wart, 2003).

However, researchers have also cautioned about the overuse of support for followers. In cases where follower responsibility is abdicated to the leader, the leader has been seen as a scapegoat or surrogate for individual responsibility (Krech & Crutchfield, 1948). Consequently there has been a need for effective leaders to balance the need to voluntarily subordinate their needs for the needs of their followers (Sendjaya et al., 2008) without checking out or becoming detached from the execution of the process (Metcalf, 1984).

Fostering and maintaining good relations

One of the core responsibilities of a leader has been identified as facilitating cooperation and team work (Van Fleet & Yukl, 1986; Yukl & Nemeroff, 1979; Wells, 1997). Leaders have been found to achieve group cohesiveness (Bonjean & Olson, 1964) by knowing followers (Helme, 1974) and actively maintaining interpersonal relationships (Wofford, 1971), and encouraging group preservation activities (Misumi, 1985).

The ability to network has been identified as a method effective leaders use to foster and maintain good relations (Senge, 1995; Yukl, 1998). To cultivate good relations with followers (Sayles, 1981) effective leaders have been found to socialize (Luthans & Lockwood, 1984; Ohmstead et al., 1973) and actively attempt to draw individuals in (Metcalf, 1984). Effective leaders have been found to be adept at interacting with both followers (Bennett, 1971; Bowers & Seashore, 1972) as well as outsiders (Luthans & Lockwood, 1984).

Cultivating and tending to relationships has been a prominent theme in the literature (Blake & Mouton, 1964; George, 2003; Pigg, 1999; Stogdill & Shartle, 1955). Researchers have found that effective leaders act in a transparent manner (Walumbwa et al., 2008), actively seeking to facilitate follower relationships (Har-Evan, 1992; Quinn, Dixit, & Fareman, 1987; Yukl & Nemeroff, 1979) and integrate followers into the group (Israel et al., 1998). One intended result of such behavior has been to foster a sense of fidelity amongst followers (Velasquez, 1992); however, other researchers have cautioned against too much emphasis being placed on fostering and maintaining good relations at the detriment of other group needs (Miller, 1973; Reddin, 1977). Specifically, Heifetz (1994) identified a tendency towards work avoidance if followers are provided too much accommodation.

Managing conflict

A characteristic of effective leaders has been their ability to manage conflict based on the deleterious effect conflict can have on maintaining good relations amongst individuals (Luthans & Lockwood, 1984; Van Fleet & Yukl, 1986; Yukl & Nemeroff, 1979). A leader's ability to manage differences (MacKenzie, 1969) and act as an arbitrator (Krech & Crutchfield, 1948), compromiser (Reddin, 1977) or judge (Haiman, 1951; Mooney & Reiley, 1931) has been well established. Ultimately a leader's ability to evaluate (Selznick, 1957) and manage conflict (Yukl, 1998) act accordingly has been shown to relate to their ability to build and maintain their team (Yukl, 1998).

Understanding, caring, and consideration for others

Providing individualized consideration for followers has been established as one of the primary actions of effective leaders (e.g. Bass & Avolio, 1990). By valuing people (Laub, 1999) and putting followers first (Liden et al., 2008) effective leaders have demonstrated their empathy (Greenleaf, 1970) and commitment to understanding followers (Katz, 1955).

Numerous authors have applied the term consideration to define the set of leadership activities directed at understanding and caring for others (Fleishman, 1953; Halpin & Winer, 1957; Reaser, Vaughan, & Kriner, 1974; Stogdill et al., 1962; Stogdill, Goode, & Day, 1965). As caretakers (Rothschild, 1993) leaders have been found to seek feelings (Metcalf, 1984) from followers and provide individualized support accordingly (Podsakoff, MacKenzie, Moorman, & Fetter, 1990). When leaders fail to actively foster an understanding and caring environment they have been viewed as bureaucratic (Birnbaum, 1988; Reddin, 1977; Shrivastava & Nachman, 1989; Wells, 1997) with more focus on shutting others out (Metcalf, 1984) and retaining their leadership role (Stogdill et al., 1965).

Leaders that actively seek to understand and care for others are frequently viewed as highly sensitive to both follower and environmental needs (Conger & Kanungo, 1998). Effective leaders have been found to apply their social judgment skills (Halpin & Winer, 1957; Mumford et al., 2000) to act with awareness (Berkowitz, 1953; Greenleaf, 1970) and respect for followers (Craig & Gustafson, 1998; Graen & Uhl-Bien, 1995). Although the amount of tolerance (Stogdill et al., 1962) and understanding expected amongst followers has been shown to vary based on cultural heritage (Hofstede, 1980; House, Hanges, Javidan, Dorfman, & Gupta, 2004) the appreciation for leader consideration and heart has been shown to be almost universally valued (George, 2003).

Fostering happiness

An expected outcome associated with understanding, caring, and consideration of others has been follower happiness (Bass, 2008). Specifically, effective leaders have tended to be alert to morale (Sayles, 1981) and have

actively worked to maintain morale (Helme, 1974). One of the primary approaches leaders have sought to address happiness and morale issues has been through the process of healing (Greenleaf, 1970) or emotional healing (Barbuto & Wheeler, 2006; Liden et al., 2008). Emotional healing has been defined as “the act of showing sensitivity to others’ personal concerns” (Liden et al., 2008, p. 162). Researchers have found that followers tend to be happier and more content when they are lead in a manner congruent with their personal preferences (Hofstede, 1980; House et al., 2004). As a consequence an effective method to foster happiness amongst followers has been to attend to follower concerns (Liden et al., 2008).

Motivating others

One of the primary responsibilities of a leader has been to motivate their followers (e.g. Bass & Avolio, 1990; House, 1977; Kouzes & Posner, 2002). One of the core factors of transformational leadership has been inspirational motivation where leaders articulate a vision for the future that motivates and inspires their followers to act (Bass & Riggio, 2006). Other researchers have described a leader’s ability to motive followers as encouraging the heart (Kouzes & Posner, 2002), arousing motives (House, 1977), setting high performance expectations (Podsakoff et al., 1990), providing meaning (Terry, 1993) or hope (Luthans & Avolio, 2003).

One of the primary mechanisms leaders have motivated followers has been through the use of goals. After setting goals (Farr, 1982; Oldham, 1976, Winter, 1978, Wofford, 1967; Van Fleet & Yukl, 1986), ensuring the goals are in alignment with the institutional mission (Selznick, 1957), and articulating goals to followers (House, 1977) effective leaders have sought to help followers connect with the goals (Kirk & Shutte, 2004) and accept group goals (Podsakoff et al., 1990). In the process of achieving a goal leaders frequently apply appropriate pressure (Wilson et al., 1990) and explain how goals will be met (Bass, 1981).

Inspiring followers has been identified as another effective motivational strategy. When leaders inspire a shared vision (Kouzes & Posner, 2002) they have been found to foster an environment of loyalty (Gross, 1961), optimism (Luthans & Avolio, 2003) and commitment (Larson & LaFasto, 1989). Leader and follower fulfillment (Terry, 1993) and connectivity (Kirk & Shutte, 2004) have also been associated with inspiring and influencing others (Wong & Davey, 2007; Yukl, Wall, & Lepsinger, 1990).

One of the mechanisms researchers have found that leaders motivate and inspire their followers has been through the articulation of a vision (Conger & Kanungo, 1998; Dennis & Bocarnea, 2005) and purpose (George, 2003; Pigg, 1999). When leaders provide foresight (Greenleaf, 1970) to their followers and are accurate in forecasting (McGrath, 1964; Stogdill et al., 1962) potentialities they have been classified as visionaries (Wells, 1997) or visionary heroes (Manz & Sims, 1993). The strong convictions (Beckhard, 1995) and achievement orientation (House & Mitchell, 1974) of a leader have also been associated with maintenance (Schein, 1995) and existence (Terry, 1993) of persistent leader and follower identities within the mutual interaction.

Delegating and empowering

Leaders that tend to delegate responsibilities and empower followers in appropriate situations have been found to be perceived as effective (Yukl et al., 2002). Delegating responsibilities to followers has been a very common theme within the literature (Hemphill, Siegel, & Westie, 1951; Hersey & Blanchard, 1969; Miller, 1973; Tannenbaum & Schmidt, 1958; Wilson et al., 1990; Van Fleet & Yukl, 1986; Yukl, 1998). Assigning (Olmstead, Lackey, & Christensen, 1975), organizing (MacKenzie, 1969), coordinating (Gross, 1961), and ensuring task achievement (Winter, 1978) has been viewed as highly related to the delegation of responsibilities.

Typically, delegation has implied that the directionality of responsibility has flowed from the leader to the

follower (e.g. Yukl, 1998); however, follower empowerment has been conceptualized as a broadening of the follower domain of responsibility more generally (Liden et al., 2008; Dennis & Bocarnea, 2005). When leaders have enabled followers to act (Kouzes & Posner, 2002) and then stood back from the process (Van Dierendonck & Nuijten, 2011) researchers have found that they tend to create a co-learning environment (Israel et al., 1998) and a sense of community between leader and follower (Greenleaf, 1970; Laub, 1999).

When leaders have shared leadership (Laub, 1999) they tended to be viewed as more collegial (Birnbaum, 1988) and connective in their leadership approach (Kirk & Shutte, 2004). When delegation and empowerment has been taken to an extreme, researchers have identified laissez-faire leadership the result (e.g. Bass & Avolio, 1990). Laissez-faire leaders have tended to be hands off in their approach to work to such a degree that their involvement has been viewed as inconsequential to the outcomes of their followers (Bass & Avolio, 1990; Tannenbaum & Schmidt, 1958).

Promoting collective decision making

Researchers have found that effective leaders frequent engage followers to help make decisions (Van Fleet & Yukl, 1986) whether through consultation (e.g. Wong & Davey, 2007), collaboration (e.g. Larson & LaFasto, 1989) or participation (e.g. House & Mitchell, 1974). Wong and Davey (2007) identified consulting and involving others as a key factor to leadership effectiveness. The recommendation of these researchers for leaders to actively consult with others has been reinforced and supported by numerous others (Fine, 1977; Kessing & Kessing, 1956; Stogdill, Wherry, & Jaynes, 1953; Tannenbaum & Schmidt, 1958; Tornow & Pinto, 1976; Yukl, 1998).

Promoting a collaborative climate (Larson & LaFasto, 1989) by inviting participation from followers (Metcalf, 1984) has been found to result in greater perceptions of group decision making (Miller, 1973) and partnerships (Israel et al., 1998). By acting in a participative manner (House & Mitchell, 1974; Tannenbaum & Schmidt, 1958) and encouraging participation from followers, effective leaders foster an environment conducive to group decision making (Yukl & Nemeroff, 1979).

Although promoting collective decision making has been generally found to be associated with effective leadership in the literature (e.g. Bass, 2008), the universality of group decision making has been a topic of contention. Specifically, Hofstede (1980) and House et al. (2004) both identified cultural preferences related to power distance and in-group or institutional collectivism. Depending on a follower group's preference for direction or participation an overabundance of follower participation may be associated with ineffectual leadership (Hofstede, 1980; House et al., 2004).

Developing others

Previous researchers have found that “effective managers take a more active role in developing the skills and confidence of subordinates” (Yukl et al., 2002, p. 21). The importance of developing followers has been a persistent theme within the literature (Bradford & Cohen, 1984; Cribbin, 1981; Laub, 1999; MacKenzie, 1969; Reddin, 1977; Winter, 1978; Wong & Davey, 2007; Yukl, 1998). However, the specific mechanisms for providing development have been varied.

Training has been one of the primary channels leaders have provided development to their followers (e.g. Kraut, Pedigo, McKenna, Dunnette, 1989; Morse & Wagner, 1978; Elliott, Harden, Giesler, Scott, & Euske, 1979). Based on a leader's commitment to the growth of others (Greenleaf, 1970) specific training interventions have included coaching (Hersey & Blanchard, 1969; Van Fleet & Yukl, 1986), orientation (MacKenzie, 1969) and operations (Gilbert, 1975) training, as well as on-the-job training (Nealy & Fiedler, 1968).

Counseling and mentoring have also been identified as methods effective leaders have used to develop others (e.g. Liden et al., 2008; Wells, 1997). Helping followers to grow and succeed (Liden et al., 2008) through advising and counseling (Clement & Ayres, 1976; Elliott et al., 1979; Farr, 1982; Van Fleet & Yukl, 1986; Winter, 1978) has been a common theme. Additionally, acting as a mentor for followers and providing nurturing support has been seen as effective (Berkowitz, 1953; Quinn et al., 1987; Wells, 1997).

From a critical developmental perspective researchers have also found that leaders frequently must provide feedback and potentially mete out discipline (e.g. Bass, 1981; Luthans & Lockwood, 1984). In concordance with Bass and Avolio (1990) who identified management by exception, both active and passive, as characteristics of transactional leadership, additional authors identified disciplining and punishing as the responsibility of a leader (Luthans & Lockwood, 1984; Oldham, 1976; Winter, 1978). One of the mechanisms a leader may use to manage follower performance (Kraut et al., 1989) has been through the use of feedback (Wilson et al., 1990). Both getting (Jacobs, 1983) and providing feedback (Bass, 1981) have been identified as important. However, leaders have also been found to extend beyond the constructive intent of development to stray into attacking (Metcalfe, 1984) and criticizing (Van Fleet & Yukl, 1986).

Encouraging innovative thinking

One of the methods effective leaders have been found to develop in others has been to encourage their followers to think creatively (e.g. Bass & Avolio, 1990). Leaders have been found to use their influence with followers (Bonjean & Olson, 1964; Winter, 1978) to encourage them to challenge the process (Kouzes & Posner, 2002) and think in a revolutionary manner (Paige, 1977). For example, both Bass and Avolio (1990) as well as Podsakoff, MacKenzie, Moorman, and Fetter (1990) identified the factor of intellectual stimulation as a component of effective leadership. Encouraging followers to think beyond the constraints of what a current reality may dictate has been found to be related to follower development and performance (Bass & Riggio, 2006).

Rewarding and recognizing others

According to Yukl, Gordon, and Taber (2002), “effective leaders provide extensive praise and recognition to subordinates for their achievements and contributions” (p. 21). Numerous researchers have identified the allocation of rewards (Bass, 1981; Miller, 1973; Winter, 1978) and rewarding (Oldham, 1976; Olmstead et al., 1975; Yukl, 1998) as core components of leadership.

Within the literature the concept of rewards have been conceptually associated with control mechanisms (MacKenzie, 1969). For example, contingent reward has been described as a form of remuneration apportioned to a follower based on the satisfactory completion of a mutually agreed task (Bass & Avolio, 1990). Correcting and rewarding (Shewel & Peterson, 1958) and serving as purveyor of rewards and punishments (Kretch & Crutchfield, 1948) have been suggested as similar concepts by other researchers.

Although thematically similar to rewarding, providing praise and recognition has been described as conceptually unique (Van Fleet & Yukl, 1986; Yukl et al., 2002). Recognizing the contribution of followers (Hempill, 1950; Larson & LaFasto, 1989; Yukl, 1998; Yukl et al., 1990) without the expectation of an associated reward tends to be more personal and developmentally impactful (Yukl et al., 2002).

Interpersonal Leadership Conceptual Model

Based on the review of the existing literature, a conceptual model of the interpersonal leadership framework has

been proposed (Figure 2-1). The model synthesized the previous taxonomic recommendations within the literature (Bass, 2008; Fleishman et al., 1991; Yukl et al., 2002).

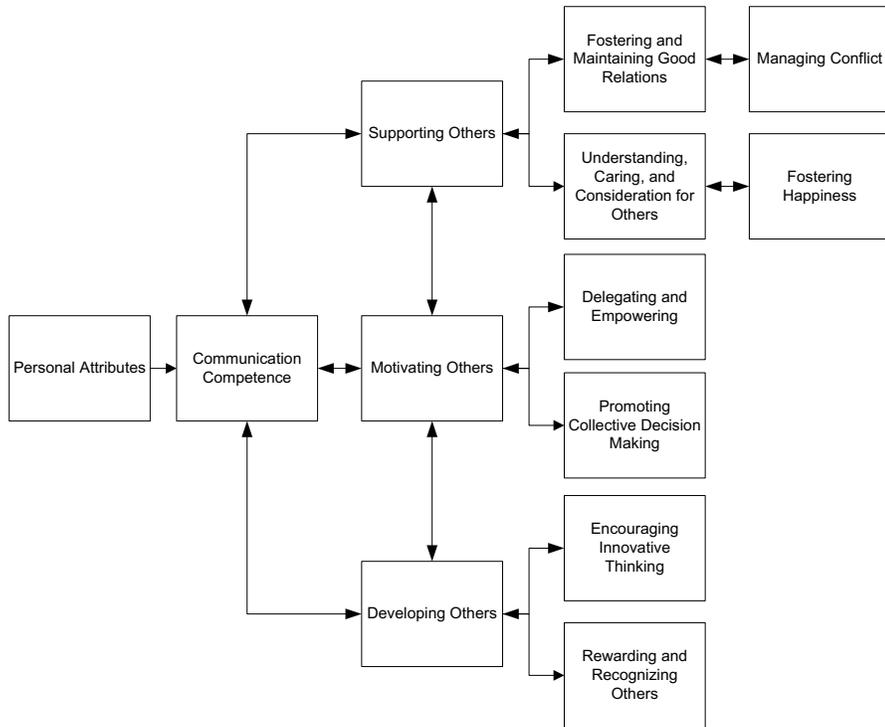


Figure 1. Conceptual model of interpersonal leadership framework

From an interpersonal perspective, a leader's personal attributes have been expected to be a necessary set of antecedent conditions satisfied in order to function as a leader (Bass, 2008). For example, acting as a model (e.g. Bass & Avolio, 1990; Kouzes & Posner, 2002) with a sufficient degree of expertise (Mumford et al., 2000), wisdom (Barbuto & Wheeler, 2006), assertiveness (House et al., 2004), and self-awareness (Walumbwa et al., 2008).

Communication competence was identified as a secondary set of fundamental leadership activities (Bass, 2008; Fleishman et al., 1991). Gathering (Metcalf, 1984), clarifying (Yukl, 1998), exchanging (Luthans & Lockwood, 1984), and disseminating (Israel et al., 1998; Van Fleet & Yukl, 1986) information through appropriate communication channels (Olmstead et al., 1976; Wilson et al., 1990) were identified as primary themes within the literature.

Extending beyond the necessary antecedent conditions necessary for leadership to occur a secondary level of concurrent leader actions were identified. Specifically, within the context of applied leader action, supporting (Yukl et al., 2002), motivating (Fleishman et al., 1991), and developing (Fleishman et al., 1991; Yukl et al., 2002) others were identified.

At the core of effective leader behavior has been the need to effectively motivate others (Fleishman et al., 1991; House, 1977; Kouzes & Posner, 2002; Terry, 1993). Motivation has been established as a core contributing factor to a leader's ability to effectively support (Yukl et al., 2002) and develop (Fleishman et al., 1991; Yukl et al., 2002) others. According to the literature, effective leaders motivate their followers with an appropriate use of goals (e.g. Podsakoff et al., 1990), inspiration (Luthans & Avolio, 2003; Kouzes & Posner, 2002; Terry, 1993), vision (Greenleaf, 1970), and purpose (George, 2003; Pigg, 1999).

One of the methods leaders have been shown to leverage to motivate others has been through delegating (Bass, 2008; Hersey & Blanchard, 1969; Laub, 1999) and empowering followers (Liden et al., 2008; Van Dierendonck & Nuijten, 2011; Yukl et al., 2002). A greater sense of community has been observed as a result (Greenleaf, 1970).

A second method leaders have been shown to employ to motivate others has been to promote collective decision making (Bass, 2008). By consulting (Wong & Davey, 2007), collaborating (Larson & LaFasto, 1989), and participating (House & Mitchell, 1974) with others leaders have been shown to provide more follower accountability and subsequent motivation (Bass, 2008).

A secondary primary focus for leaders has been identified as supporting others (Yukl et al., 2002). Leaders have been shown to serve (Greenleaf, 1970) and support (House & Mitchell, 1974) others in multiple ways. While fostering and maintaining good relations (Bass, 2008), leaders have been shown to facilitate cooperation and team work (Van Fleet & Yukl, 1986), network (Yukl, 1998), and establish relationships (George, 2003; Pigg, 1999). According to the literature, a thematic extension of fostering and maintaining good relations was managing conflict (Bass, 2008; Luthans & Lockwood, 1984).

To further support their followers effective leaders have also been shown to actively engage in trying to understand, care for, and be considerate of others (Bass, 2008). Consequently, effective leaders have tended to focus on each individual (Bass & Avolio, 1990) and be sensitive to the needs of others (Conger & Kanungo, 1998). As an extension of attempting to understand and care for others, effective leaders have also been shown to foster happiness (Bass, 2008). Allowing for emotional healing to occur (Barbuto & Wheeler, 2006; Greenleaf, 1970) and energy focused on follower morale (Sayles, 1981) has been related to follower happiness.

The third primary focus for leaders was identified as developing others (Fleishmen et al., 1991; Yukl et al., 2002). Leaders that focused on training (Greenleaf, 1970; Hersey & Blanchard, 1969; Luthans & Lockwood, 1984), counseling (Van Fleet & Yukl, 1986), mentoring (Wells, 1997), and providing feedback (Bass, 1981) to followers have been viewed as effective.

To further develop others, effective leaders have been shown to encourage innovative thinking (Yukl et al., 2002). Superior leaders have been shown to intellectually stimulate (Bass & Avolio, 1990; Podsakoff et al., 1990) their followers and to encourage them to challenge the process accordingly (Kouzes & Posner, 2002).

Rewarding and recognizing others has also been identified as one of the main methods leaders use to develop others (Yukl et al., 2002). Through the use of rewards contingent on completion of tasks (Bass & Avolio, 1990), effective leaders can provide external stimuli to encourage desired outcomes. In a conceptually similar manner effective leaders can recognize followers for performance without the possibility of punishment (Yukl, 1998).

Conclusion

Although the term interpersonal leadership has been well established within the literature there remains a dearth of theoretical derived models that specifically address the comprehensive nature of the underlying leader behaviors and activities (Bass, 2008). The intent of the present article was to attempt to synthesize the existent leadership models, behaviors, and factors to arrive at a coherent conceptual model of interpersonal leadership. To remain relevant “effective [educational] programs require an up-to-date curriculum” (Doerfert, 2011, p. 25), accordingly the development of a robust model upon which to develop appropriate interpersonal leadership learning activities and interventions should provide valuable guidance to agricultural educators (McKeachie & Svinicki, 2011).

As a recommended next step, agricultural educators are encouraged to adopt, or adapt, the proposed model when educating on interpersonal leadership. For example, the comprehensive model may serve as an appropriate guide for developing a semester long undergraduate curriculum. Alternatively, a purposive selection of a particular content area, such as motivating others, may be helpful when conducting non-formal education with professional audiences.

Future research is recommended to validate the proposed relationships between concepts in the model. Additionally, an extension of the present model linking content areas to outcomes, such as learner performance or satisfaction, may provide implications for teaching. Furthermore, the development and validation of a norm-referenced criterion scale developed according to the proposed model may be valuable from a leader competence and developmental perspective (Pett, Lackey, & Sullivan, 2003).

According to Doerfert (2011) “highly effective educational programs will meet the academic, career, and developmental needs of diverse learners” (p. 10). A structured approach to teaching interpersonal leadership should help to inform both efficient and effective agricultural education programs within that context (Doerfert, 2011). A robust conceptual model of interpersonal leadership grounded within the theory base should provide educators with a framework upon which to develop learners accordingly (McKeachie & Svinicki, 2011).

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Acculturation and Leadership Styles among Latino or Hispanic

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Acculturation and Leadership Styles among Latino or Hispanic Faculty and Staff at Texas Tech University

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Abstract

The purpose of this case study was to describe the acculturation level and leadership style of Latino or Hispanic faculty and staff at Texas Tech University. Five face-to-face interviews were conducted with Hispanic or Latino faculty and staff at Texas Tech University. For the analysis of the study grounded theory methods were used, including open coding and axial coding to identify emerging themes: language, cultural heritage, mentorship, education, leadership, acculturation, among others. An online survey was distributed. Thirteen Latino or Hispanic faculty and staff ($n = 13$) responded to the acculturation survey and twelve ($n = 12$) responded to the leadership survey. The majority of the participant scores were in Level II ($n = 5$) and Level III ($n = 5$). The majority of the participants' scores on people orientation and task orientation classified them as team leaders. There was a negligible negative relationship between acculturation score and leadership style $r(10) = -.057$, a moderate negative relationship between acculturation score and country of birth $r(10) = -.476$, and a very substantial positive correlation $r(10) = .594$ between acculturation scores and years lived in the United States.

Introduction

There is a limited availability of studies related to Latinos' leadership styles (Trevino, 2010), necessitating the studying of the relationship between acculturation and leadership styles and their contribution to our understanding of Latinos' leadership and potential. The main objective of measuring acculturation is to determine how individuals are adapting to a new culture and identify the particular area of their lives they have changed while living in the new culture (Cabassa, 2003). It is important to study the level of acculturation and leadership style of the Latino faculty and staff at Texas Tech University; as well as understanding their relationship and the impact on their work environment.

Hispanic Demographics

“Hispanic or Latino” refers to a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race (U.S. Census, 2010). According to the 2010 United States (U.S.) Census, the total population of the U.S. was 308.7 million people, of which 50.5 million (16%) were of Hispanic or Latino origin. There has been increase in the Hispanic population; in the year 2000 they represented 13% of the population. More than half of the total population growth in the U.S. during the years 2000 to 2010 was due to the increase in the Hispanic population. The Hispanic population increased from 2000 to 2010 by 15.2 million, which represents over half of the 27.3 million increase in the total population of the U.S. (U.S. Census, 2010). The U.S. Census Bureau projects that in the year 2050 the Latino population will represent 30% of the U.S. population (Martinez & Gardner, 2011). In 2010, over half of the Hispanic population in the U.S. resided in just three states: California (28%), Texas (19%) and Florida (8%) (U.S. Census, 2010). The majority of Hispanic population in the U.S. is Mexican; which represents a 63% of the Hispanic population, followed by 13.5% from Central and South American countries (U.S. Census, 2010).

Hispanics in the workforce

In 2006, Hispanics represented 14% of the U.S. labor force, 15% of unemployed, 12% of the long term unemployed, 22% of those working part-time and 13% of the marginally attached workers (Santiago, 2008). According to the U.S. Bureau of Labor Statistics in 2007, the median weekly earnings of Hispanics were lower than other groups. According to the U.S. Bureau of Labor Statistics 2006, unemployment rates generally decline with higher education levels (Santiago, 2008). Demographic data reveals that the Hispanic population tends to be younger, have lower levels of education, earn less money and tend to be more group oriented (Trevino, 2010). Latinos comprised only 4.5% of management and officials, 5.7% were professionals, and 3.9% were technicians as compared to Whites who comprised 12.6% of management and officials, 17.8% professionals, and 6.5% technicians. These percentages show the low earning potential of Latinos in the U.S. (Zoppi, 2005).

Hispanic educational attainment

According to the U.S. Census Bureau (2002), as a percent of each population 25 years and older. Levels of education vary between Hispanic and non-Hispanic whites, 27% of Hispanics attain less than 9th grade compared to 4% of non-Hispanic white. High school graduate it is the highest percentage for both groups Hispanic (45.9%) and non-Hispanic white (59.3%). The number obtaining bachelor degrees decreases for each population but less attainment with only 11.1% for Hispanics compared with 29.4% for non-Hispanic white. Economic attainment can be directly linked to educational attainment. This is why Latinos will have to make big gains in both educational and economic attainment if they want to contribute to and share in the economic prosperity of the U.S. (Trevino, 2010).

Leadership behaviors

There are limited studies on Latinos and leadership (Trevino, 2010). Given the increase of the Latino population in the U.S., the globalization of industrial organizations, as well as the interdependencies among different countries around the world, it increases the need of leaders who understand how culture can influence leadership behaviors (Trevino, 2010). According to Bordas (2012) there should be a multicultural leadership approach such as being open to different cultural perspectives, and to value the cultural differences and contributions. United States' leadership role in the area of agriculture-related fields should continue to seek alternatives to enhance participation of ethnic minority groups (Jones & Larke, 2001).

Acculturation

Berry (2005), suggested that individual acculturation could be classified into one of four different strategies: integration, separation, assimilation and marginalization. Integration has both a positive attitude towards keeping one's cultural heritage and as well as learning and interacting with the new culture. The opposite of Integration is Marginalization with a negative attitude towards one's cultural heritage and towards the new culture. On the other hand, Assimilation reflects a positive attitude only towards the new culture, while Separation records a positive attitude only towards the cultural heritage (see Table 1). The level and speed of acculturation varies across generations. Second and third generation individuals tend to have greater acculturation levels to the host country compared to first generation individuals (Organista, Marin & Chun, 2010). Acculturative stress is described as the challenges and difficulties experienced by acculturating individuals such as learning the language, group and interpersonal behaviors, government bureaucracy, job skills and cultural values (Organista, Marin & Chun, 2010).

Table 1

Acculturation Strategies Based on Attitudes Toward Learning a New Culture and Keeping the Heritage Culture (Organista, Marin & Chun, 2010).

		Attitude towards keeping heritage culture and identity	
Attitude toward learning and interacting with new culture	Positive	Positive	Negative
	Negative	<i>Integration</i>	<i>Assimilation</i>
		<i>Separation</i>	<i>Marginalization</i>

The extent to which the Hispanic workforce is acculturated to American society and culture will affect their productivity, integration in the workplace and ultimately their career success (Romero, 2004). When organizations are more diverse they receive benefits such as better decision-making, more innovations and creativity and better marketing strategies targeted to different ethnic groups (Romero, 2004). Priority three of the National Research Agenda for Agricultural Education (Doerfert, 2011) called for sufficient scientific and professional workforce that addresses the challenges of the 21st century. Thus, understanding Latino or Hispanic faculty and staff levels of acculturation and leadership styles contributes to: “the growing need to develop strategies to create a society of diverse, highly educated professionals and knowledge workers to address major societal challenges and develop innovations that drive the engines of economic growth” (Doerfert, 2011).

Purpose of the study

The purpose of this case study is to describe the acculturation level and leadership style of faculty and staff at Texas Tech University. At this stage in the research, acculturation and leadership will be defined as how individuals adapt to a new culture and what leadership indicators they possess.

Research Questions

Qualitative- Interviews

Central Question- What are the level of acculturation and leadership style of five Latino faculty and staff at Texas Tech University?

Sub-questions- What are the cultural perspectives of the participants? What is the educational background and experience of participants? What is their self-perception of leadership?

Quantitative- Survey Instruments

Objectives

Describe the acculturation scores of Latino or Hispanic faculty and staff at Texas Tech University who participated in the study.

Describe leadership styles of Latino or Hispanic faculty and staff at Texas Tech University who participated in the study.

Determine the relationship between acculturation scores and leadership styles, years lived in the U.S, and country of birth.

Methods

This study is an instrumental case study which provides insight on Latino or Hispanic faculty and staff at Texas Tech University. The unit of study is Texas Tech University Latino or Hispanic faculty and staff. The sampling strategy to use in the study was convenience sample. Participants were identified through an existing public Latino faculty and staff organization at Texas Tech University. This organization served as the primary method

of recruiting which is considered criterion sampling. The criterion of selection was self-identification as Latino faculty and staff at Texas Tech University. The criterion sampling was complemented with snowball sampling, which identified other Latino faculty and staff at Texas Tech University. Institutional Review Board approval was obtained to conduct this study.

Data collection and analysis

Five face-to-face interviews were conducted with faculty and staff at Texas Tech University who identified themselves as Latino or Hispanic. Selected members identified through the Latino or Hispanic faculty and staff association or by snowball sampling were emailed to participate in a face-to-face interview. Recorded interviews were transcribed for analysis and comparison. Names were not used in the results (pseudonyms were used). For the analysis of the study, grounded theory methods were used, including open coding and axial coding to identify emerging themes which describe leadership and acculturation characteristics of Latino or Hispanic faculty and staff at Texas Tech University. Credibility and dependability of the study were established by triangulating the data using document analysis and literature review of previous studies. A thick description of the study, including supporting quotes and description of the context where the study took place, allowed for transferability of the findings to similar settings.

Quantitative- Survey Instruments

Through the Latino faculty and staff association, an email was sent to members to request participation in the study. An online survey instrument was distributed through Qualtrics, a web-based survey software. Thirteen Latino or Hispanic faculty and staff ($n = 13$) responded to the acculturation survey and twelve ($n = 12$) responded to the leadership survey. There were $n = 5$ male and $n = 7$ female, ($n = 1$ participant did not answer demographics) who participated in the study. The majority of the participants ($n = 7$) were in the age range of 42-49 years old, ($n = 4$) were in the age range of 34-41 years old, and ($n = 1$) was older than 57 years old. The majority of the participants were born in the U.S ($n = 9$). The average number of years participants lived in the U.S. ranged from 8- 63 years with a ($M = 34.27$, $SD = 17.31$).

The acculturation questionnaire assesses changes in behavior and values individuals experience when exposed to a new culture (Trevino, 2010). The ARSMA-II (Acculturation Rating Scale for Mexican Americans) is a 30-item Likert-type scale. This instrument measures acculturation along three primary factors: language, ethnic identity, and ethnic interaction (Jimenez, Gray, Cucciare, Kumbhani, Gallagher-Thompson, 2011). The ARSMA-II scale 1 measures Anglo Orientation Scale (AOS) and Mexican Orientation Scale (MOS) (Jimenez et.al, 2011), the MOS terms were changed to assess general Latino or Hispanic orientation. The ARSMA had been criticized for not being applicable for Hispanic groups other than Mexican-Americans. The ARSMA-II revisions remain culture specific, but may have some utility with other Hispanic groups (Cuellar, Arnold & Maldonado, 1995). Two subscales were used, Mexican Orientation Scale (MOS) and Anglo Orientation Scale (AOS). The MOS included 17 items and a reported coefficient alpha of .88. AOS had 13 items with coefficient alpha of 0.83. Each of these scores indicates acceptable reliability (Trevino, 2010).

The mean of MOS was subtracted from AOS to obtain acculturation scores; low scores indicate a Mexican orientation while high scores indicate Anglo orientation (Jimenez et.al, 2011). According to Cuellar (1995) the acculturation scores are interpreted in the following manner: Level 1 represents a Very Mexican Orientation (mean < -1.33); Level 2 represents Mexican oriented to Approximately Balanced Bicultural (mean ≥ -1.33 and $\leq -.07$); Level 3 represents Slightly Anglo Oriented Bicultural (mean $> -.07$ and < 1.19); Level 4 represents Strongly Anglo Oriented Bicultural (mean ≥ 1.19 and < 2.45); and Level 5 represents Very Assimilated or Anglicized Individual (mean > 2.45). The ARSMA-II has been found to have strong construct and concurrent

validity as well as high convergent validity as measured by correlating acculturation scores from the original ARSMA with those scores derived from the ARSMA-II (Cuellar et al., 1995).

Participants were also asked to complete a survey to assess their leadership style. The Leadership (managerial) Grid by Blake and Mouton (1985), connects concern for production (x) with concern for people (y) in an intersecting axis. Each of the axes is drawn on a 9-point scale, 1 being minimum concern and 9 expressing maximum concern. Position on the Leadership Grid reflected five major leadership styles: Authority compliance (9, 1), Country Club management (1, 9), Impoverished management (1, 1), middle of the road management (5, 5), and team management (9, 9) (Blake and Mouton 1985, as cited in Northouse, 2013). This was an 18-item Likert-type scale questionnaire.

Findings

Qualitative

Results revealed two distinct groups of Latino or Hispanic faculty and staff at Texas Tech University. One group was comprised those who are faculty of international origin but are now working in the U.S. The second emergent group consisted of those who were born in the U.S. and possess Hispanic cultural background. Three of the participants were international (2 faculty, 1 staff) and two participants were born in the U.S (1 faculty, 1 staff).

Group One- International faculty

Research Question 1: What are the cultural perspectives of the participants?

Hispanic vs Latino	<p>“Hispanic could be just those that are related to each other by the language, so I will consider Brazilians to be Latinos, but not necessarily Hispanic...”</p> <p>“I had never thought about the definition”</p>
Cultural Heritage	<p>(1) “When I think about culture, I think in terms of what I miss when I am here in the U.S...for new year the whole family gets together...”</p> <p>(1) “I think about friends, the community being closer, here people are more independent.”</p> <p>(2) “...I think of food, fruits and vegetables and the availability of them, not as expensive as here...”</p>
Language	<p>(1) “... because most of my graduate training was in English, sometimes I have difficulty speaking the jargon of economics in Spanish...”</p> <p>(2)“... professors with accents have on average lower teaching evaluations, than those who do not have an accent... that hasn’t stopped me from being promoted, been relatively successful in the profession...”</p> <p>(2) “When I came here I did not speak English, zero English...I had to be very disciplined to learn English</p>

<p>in the U.S., they became more fluent in technical English and vocabulary from their career field. For that reason, they felt more comfortable speaking English for work related situations.</p>	<p>in 6-8 months to start my masters”</p> <p>(2) “I would like to be more fluent, more precise, make less mistakes...in conferences I feel limited by the language...”</p>
<p>Added value as Latino or Hispanic</p> <p>This theme referred to participants’ perception of how being a Latino or Hispanic provided added value to their profession. They believed knowing a second language provided benefits such as expanding social networks and working on international projects.</p>	<p>“... maybe it has made me a little bit different than others in my profession, like I have a different network, especially with people in Latin America it has opened a few doors...”</p> <p>“...because of the language I am able to actually travel, when we started doing all these projects, international projects and everything abroad...”</p>
<p>Acculturation</p> <p>New culture acceptance (1), Own culture maintenance (2)</p> <p>This theme referred to how participants related to the host culture (U.S) and how they maintained their own cultural background. They mentioned feeling comfortable in the new culture and one of the participants actually stated how, even before coming to the U.S., his cultural background was deviant from the Latino or Hispanic prototype.</p>	<p>(2) “... so I am married she is also from [country in LA]...”</p> <p>(1) “...I don’t consider myself Latino, or Hispanic in some things, just because I know I am completely the opposite to what the Americans or the rest of the world would consider is Latino, [example] Latino time...”</p>

Research Question 2: What is the educational background and experience of participants?

<p>Higher education</p> <p>This theme described the career path and commitment to higher education. The participants described their educational trajectory in which U.S. education has played a key role for their development.</p>	<p>“I received my undergraduate from [University in Honduras], then I came to do an internship at [university U.S]... after that I came to [US university] for my master’s ... after that I went to do my PhD in [US university]...”</p>
<p>Mentorship</p> <p>This theme referred to the importance of a mentor in their career development to continue higher education and as career support.</p>	<p>“...she was my advisor and she gave me the opportunity to work here, and I have worked for her really 8, 9 years and now she has been my guide.”</p> <p>“ I have a Latino friend, he became a motivational person, telling me you can do it, keep working hard”</p>
<p>Passion</p> <p>Passion for work (1), Goal oriented(2)</p> <p>This theme referred to participants’ passion for career which related to their commitment to higher education. One of the participants mentioned how being goal-oriented and committed to his (or her) dreams made a difference in his (or her) career.</p>	<p>(2) “...I kind of declined from other opportunities, in other areas, because I knew that was what I liked and that’s what I wanted to do with my career.”</p> <p>(1)“I think I am passionate of what I am doing...that helps me to sometimes put in the extra work, trying to be a little more productive...”</p>

<p style="text-align: center;">Career in Academia</p> <p>Job Satisfaction (1), Tenure (2), Frustration (3), Work Environment (4), Work Load (5)</p> <p>Another major theme that emerged was career in academia, including subthemes such as job satisfaction, which connected to importance of passion and doing what you like. Another subtheme was tenure; they mentioned how getting tenure was key in their professional development. Frustration referred to how they felt about things out of their control related to their experience in academia. Work environment referred to how they felt working with others, which was described as excellent and described how people are very friendly and open. Finally work load referred to participants' perception of work load as a faculty member which they said required working extra hours, during weekends. At the same time they indicated the advantage of certain level of flexibility that other type of work do not have.</p>	<p>(1) "... if you can get a job where you do what you really like, that's the best thing that can happen to you..."</p> <p>(2) "Something that I would like to improve are negotiation skills..."</p> <p>(3) "Sometimes I suffer from impostor syndrome, like I am very hard on myself..."</p> <p>(3) "...not getting the grants I want (laughs)... to spend all this time, writing and writing and nothing is accepted..."</p> <p>(4) "overall [work environment] is excellent, you know, I have not only worked here, I have worked in other universities...the environment is great I cannot complain"</p> <p>(5) "...I will say 90% of the time I am still working at home, till 1 o'clock in the morning, or Saturdays and Sundays..."</p>
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Research Question 3: What is their self-perception of leadership?

<p style="text-align: center;">Risk aversion</p> <p>This theme referred to their lack of willingness to take risks. Participants consider their current risk willingness as low because they have to consider their family and security, however, the fact of leaving their country and moving to a new place, indicated they had been risk takers at some point.</p>	<p>"The fact that I left home when I was really young and then I moved to different places, I think that shows I was willing to take risks. Of course as you have family, you have kids, you become less of a risk taker, you think about your family."</p>
<p style="text-align: center;">Leadership</p> <p>General perception (1) , Self-perception (2)</p> <p>This theme described their general leadership perceptions of leaders and leaders' characteristics. Their self-perception of leadership indicated they considered themselves leaders on some level. For them, just the fact of being a faculty equated to leadership of students.</p>	<p>(2)"I am a leader because I think you need to show some level of leadership to be able to work with like graduate students, as a professor you need to show some kind of leadership..."</p> <p>(1) "...either you can be born with, you know with this personality to allow you to be very charismatic and everyone will be charmed with you..."</p>

Group 2- Born in U.S

For group two these were the common themes that emerged from the interviews.

<p style="text-align: center;">Research Question 1 Hispanic background</p>	<p>"I am probably 6 generations Hispanic, but relatives, ancestry of Texas..."</p>
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	“I don’t like the word Latino...Latino encompasses various groups...I prefer Hispanic”
<p><u>Research Question 1 Culture</u> Family cooking</p> <p>The participants talked about food and language as sign of cultural heritage.</p>	<p>“Family cooking, novelas, church which is a central part of our identity” “The food and the language really is where we maintained that culture...” “In my household we spoke Spanish, ate Tex-Mex food traditional home style” “English was our first language...and mixed it with Spanish” “There are subcultures within Hispanic culture” “I think we can generalize Hispanics in terms of family, very conservative, faith driven culture...”</p>
<p><u>Research Question 1 Language</u></p> <p>Participants did not consider themselves fluent in Spanish.</p>	<p>“I speak English but not a lot, I can get around...” “My parents did not teach me Spanish, because when they were growing up the culture at least in Texas is that no one was allowed to speak Spanish in school, they were actually punished when they spoke Spanish”</p>
<p><u>Research Question 1 Diversity</u></p> <p>They considered being Hispanic as a contribution to diversity of society.</p>	<p>“ Being a Hispanic, means I have something to contribute to diversity, it is no fun when everyone is the same” “Having a Hispanic background has created in me the ability to have different perspectives on other cultures” “ A lot of people call us an underserved population, I think it is offensive...I felt like I had the same opportunities as everyone out there” “If you are an international faculty member, you don’t count as a minority...”</p>
<p><u>Research Question 2 Educational influence</u></p> <p>Education was a priority for their families.</p>	<p>“My mom was the first in her family to get a degree, she inspired us to achieve higher education” “My mother and my father, education was a top priority at our house.”</p>
<p><u>Research Question 3 Risk</u></p> <p>Risk taking was a necessity.</p>	<p>“There is no way you can advance if you don’t advance yourself”</p>

Quantitative

The acculturation score had ($M = .423$, $SD = .946$), this mean score would be located on level III which represents Slightly Anglo Oriented Bicultural (mean $> -.07$ and < 1.19). The majority of the participants’ score was in Level II ($n = 5$) and Level III ($n = 5$), Level IV ($n = 2$), and Level V ($n = 1$). Scale 1 of ARSMA-II yielded information on two acculturation modes: integration and assimilation (Cuellar et.al, 1995). Assimilation referred to individuals in the process of acculturation adopts/adapts behaviors, language, beliefs, practices and values of the group to which the individual is acculturating (Cuellar et.al, 1995). Integration occurs in the acculturation process when an individual develops a bicultural orientation and integrates cultural aspects of both groups and feels identified and comfortable with both groups (Cuellar et.al, 1995). The majority of the participants were in Level II and Level III; the Level II scores are very close to becoming Level III, indicating Slightly Anglo Oriented Bicultural, which is in the middle of scale. This means individuals have developed a sense of integration by being bicultural and are in the transition to becoming more Anglo oriented but are far from being completely assimilated. See Figure 1.

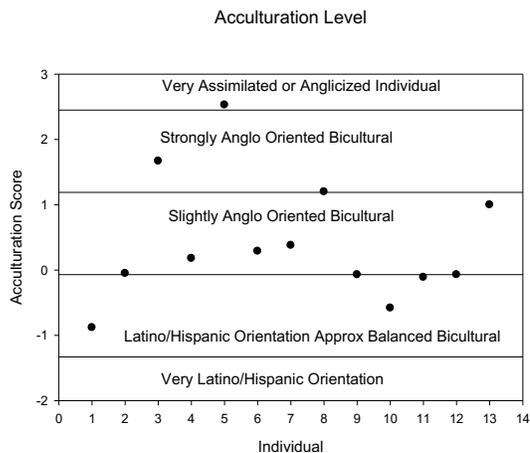


Figure 1. Acculturation scores and corresponding levels.

The majority of the participants' scores on people orientation and task orientation classified them as team leaders. Team management excels in both task and interpersonal relationships. A high degree of participation and teamwork is promoted which creates commitment to their work (Northouse, 2013). See Figure 2.

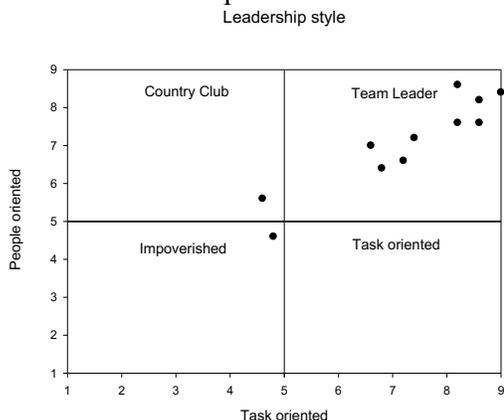


Figure 2. Leadership style of participants according to Leadership (managerial) Grid.

There was a negligible negative relationship between acculturation score and leadership style $r(10) = -.057$. There was a moderate negative relationship between acculturation score and the fact that participants were born in the U.S. $r(10) = -.476$. This indicates people who are born in the U.S. (1 = yes, 2 = no) will have higher acculturation level. There was a very substantial positive correlation $r(10) = .594$ between acculturation scores and years lived in the U.S., indicating that as the number of years living in the U.S. increased, their level of acculturation increased as well. See Table 2.

Table 2

Correlations between Acculturation Score and Leadership, Years in U.S., and Country of Birth

Correlation	Acculturation Scores	Magnitude*
Leadership	-.06	Negligible
Born in U.S.	-.48	Moderate
Years lived in U.S	.59	Very Substantial

*Strength of relationship defined by the Davis Naming Convention, Davis, J.A.

(1971). Elementary Survey Analysis. Prentice-Hall, Englewood Cliffs, N.J.

Conclusions

Latino or Hispanic faculty and staff participants at Texas Tech University can be subdivided in two distinct groups: Hispanic international faculty and staff (born outside of the U.S.) and Hispanic faculty and staff born in the U.S. Among these two groups, the study revealed a common background. Participants demonstrated

attitudes of integration by trying to maintain their cultural heritage but also learning and interacting with the new culture; however results from interviews revealed attitudes representing assimilation, which is having a more positive attitude toward the new culture and a negative attitude toward the heritage culture.

An important item of note was the value of mentorship in participants' lives. They consider this mentorship as an advisor, friend, or family who had a positive impact in their lives and inspired and motivated them to continue to study and achieve higher education. A characteristic the participants held in common was passion for their work, recognizing a career that is enjoyed will result in job satisfaction and productivity. Participants had common definitions of leadership. Some of the definitions included terms such as: convince, inspire, guidance, achieve a goal, team, motivate. Participants were low risk takers at this stage in their lives. Family was a factor that affected their willingness to take risk. Participants considered themselves as leaders at some level. Because of difference in professional experience between participants, we observed different levels of expressed leadership. Leadership needs to be promoted among the Latino or Hispanic community. Latino or Hispanic faculty can be role models, opinion leaders, change agents, which can inspire, influence and motivate the Hispanic community, especially young prospective students to continue higher education.

There was a negligible relationship between acculturation score and leadership style. There was a moderate relationship between acculturation score and if participants were born in the U.S. ($r = -.476$). It is expected that people who are born in the U.S., even though they have a Hispanic or Latino background, will have a higher level of acculturation due to the exposure to U.S. culture throughout their lives. There was a substantial correlation ($r = .594$) between acculturation scores and the number of years lived in the U.S.; the longer people lived in the U.S the higher their acculturation level. High levels of acculturation referred to being very assimilated or Anglicized individual.

House et.al's (2004) research on the relationship between culture and leadership resulted in the GLOBE research program. This study developed nine cultural dimensions. Latin America cultural dimensions included high in-group collectivism; the extent to which people are devoted to their organizations or families (Northouse, 2013). The profiles of Latin American countries rate Team-oriented leadership as one of their top three leadership behaviors preferences, compared to the Anglo profile which does not include Team-oriented leadership among their top three leadership behavior preferences. Our results indicated the majority of participants were Team-oriented which further confirmed the Latin American profile.

Recommendations

It is important to encourage Latino or Hispanic faculty to maintain their cultural heritage and share it with students and other faculty to enrich their cultural awareness and experience of the people around them. It is recommended to replicate this study with a larger sample, as well as in other universities to determine differences between Latino or Hispanic faculty and staff in other universities, and see how the university work environment plays a role in their acculturation and leadership development. In this study the main focus of results was given to international faculty because there was saturation of data in this group; however it is recommended to conduct more interviews to born in the U.S. with Hispanic cultural heritage faculty and staff, as well as their generation (1st, 2nd, and 3rd) to have a better understanding of this group. Managers in organizations should adopt diversity management programs by creating awareness of the workforce demographics, increasing sensitivity for different cultures, minimizing discrimination in the workplace, and modifying organizational culture as well as leadership practices (Romero, 2004). Although this study was not representative to the entire Texas Tech University, the results generate a useful base for future studies. Given the small sample of participants of the survey, it is not possible to generalize the results beyond the participants, but the results provide directional information about the acculturation level and leadership style of Latino or Hispanic faculty and staff at Texas Tech University.

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Using Mentor Insights to Enhance Leadership Development Programs

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Abstract

Using a semi-structured interview approach, ten mentors from a leadership development program focused on building leaders in Colleges of Agriculture and Life Sciences across the nation provided insights regarding their mentoring method, process, and experiences. Mentors interviewed agreed the mentoring process was beneficial for themselves as well as their mentee. However, clear thematic differences were evident depending on whether a previously existing relationship was in place between mentor and mentee. Specifically, mentoring relationships that were extensions of previous relationships tended to have less formal structures and more subjective outcomes than newly established mentoring relationship counterparts. Nevertheless, both categories of mentoring relationships indicated a desire for a formal set of mentoring expectations as well as access to program curriculum to help guide and inform the process.

Introduction

As a leadership developmental tool, the utility of mentoring and the mentoring process has been well established (Bass, 2008; Chun, Sosik, & Yun, 2012). Individuals that have a mentor have been found to be more likely to be promoted (Johnson, 1980), earn higher compensation (Roche, 1979), and tend to believe that they have more opportunities for career advancement and success (Fagenson, 1989). Additionally, mentoring has been shown to significantly improve retention (American Association of State Colleges and Universities [AASCU], 2006; Molner Kelley, 2004; Smith & Ingersoll, 2004) and satisfaction (Bass, 2008) amongst mentees.

According to Bass (2008), “a mentor is likely to be an immediate supervisor of the protégé but may be found at higher levels in the organization or outside the organization among those with more experience and influence than the protégé” (p. 1091). Mentors have been found to typically act as a role model to their mentee as well as provide them with coaching, visibility, and in many cases friendship (Kram, 1985). Unlike a coach that may be more focused on analysis, improvement, and practice, mentors have tended to “provide career advice and opportunities for skill development on the job, identify needs for improvement, and promote the protégé’s reputation” (Yukl, 1998, p. 102).

Generally mentoring relationships have been associated with on-the-job leadership training and development (Bass, 2008); however, based on the breadth of benefits associated with mentoring within organizations, the mentoring process has become more prevalent as an educational tool outside organizational confines. For example, the University of Southern California Marshall School of Business has a prescriptive mentoring program where, “prospective participants must show that they understand what a mentor-mentee relationship involves and demonstrate what they will get out the program and what they can contribute” (Murray, 2013, para. 4).

Similar to trends observed in settings such as MBA programs, leadership development programs have also been shown to benefit from mentoring relationships (Kanter, 2012). In training environments where individuals may be assembled from a large number of different institutions or organizations, mentoring can serve as a bridge between the centralized developmental activities and appropriate application once participants return home. For example, the purpose of the nine-month long LEAD21 program has been “to develop leaders in land grant

institutions and their strategic partners who link research, academics, and extension in order to lead more effectively in an increasingly complex environment, either in their current position or as they aspire to other positions” (Sapp, 2014, para. 2). During three on-site seminars participants primarily from Colleges of Agriculture and Life Sciences at land grant universities located across the United States and its territories, as well individuals employed with USDA/NIFA receive exposure, information, and knowledge regarding leadership competency areas. While not attending seminars, participants are expected to actively engage with a mentor to help synthesize information into local application.

Previous research has indicated that external leadership development programs focused on individuals associated with agriculture within the land grant university system may be a valuable conduit for developing a workforce capable of addressing the issues of the 21st century (Lamm, Lamm, & Strickland, 2013). However, there is a lack of research examining the nature of mentorship activities required as part of agricultural leadership development programming. Priority area four of the National Research Agenda: American Association for Agricultural Education 2011 – 2015 (Doerfert, 2011) calls for meaningful and engaged learning in all environments with a specific need to “deepen our understanding of effective teaching and learning processes” (p. 9). Consequently a study focused on the environmental, use, and outcome conditions associated with mentoring used as a learning tool within a leadership development program for individuals associated with agriculture within the land-grant university system may provide valuable educational and programmatic insights.

Theoretical Foundation

The theoretical foundation for this study was Kram’s (1985) mentor role theory. According to Kram (1985), the mentoring relationship is structured under two functions. The first is career function and second is psychosocial function. In particular, a mentor has been expected to provide guidance and support regarding a protégé’s career as well as act as a role model providing counseling and friendship. The psychosocial aspects of mentoring are associated with “activities that influence the protégé’s self-image and competence” (Chao, Walz, & Gardner, 1992, p. 620). According to Kram (1985) the career function activities generally emerge first followed by the psychosocial aspects.

Within an agricultural education context, several research studies have found the importance and efficacy of mentoring programs. For example, Eastman and Williams (1993) found mentoring was “significantly related to an individual’s feeling regarding his or her satisfaction with his or her career” (p. 75). Additionally, successful student teaching opportunities were also linked to appropriately implemented and supported mentoring relationships (Jones, Kelsey, & Brown, 2014). Foor and Cano (2012) suggested that an analysis of mentor’s abilities and beliefs was one of the critical antecedents for a successful mentoring relationship and positive mentee outcomes. However, a further investigation of mentoring relationship within agricultural education contexts have been recommended (Jones et al., 2014).

Typical formal mentoring programs within organizations are prescriptive in that a junior individual is paired with a more senior executive outside of the mentee’s line of supervision (McCaughey & Douglas, 1998). However, other mentoring programs may pair a mentee with an external resource or consultant (Douglas, 1997). Regardless of the structure, formally assigned mentors are typically expected to provide coaching as well as “sponsorship, protection, challenging assignments, and exposure to senior management thinking” (Day, 2001, p. 594).

Informal mentoring programs are generally less prescriptive in the expected hierarchy of the mentoring relationships, with few restrictions placed on the location of the mentor and mentee either within or between organizational boundaries (Day, 2001). Despite the lack of structure generally associated with informal

programs, there has been evidence that more positive outcomes are accrued for mentee's under such conditions (Ragins & Cotton, 1999). For example Chao et al. (1992) found that mentees in informal mentoring relationships tended to receive more career-related support and had higher salaries than those in formal mentoring relationships.

To effectively identify the different areas in which individuals may accrue positive outcomes associated with mentoring relationships, researchers have suggested a number of categories. For example, Hunt and Michael (1983) hypothesized that mentoring may benefit mentors, mentees, and organizations. Chao et al. (1992) proposed three primary outcomes for mentees, "organizational socialization, job satisfaction, and salary, designed to cover three significant domains: learning, affective, and objective outcomes, respectively" (p. 622). However, a gap in the literature exists specifically examining the nature of the outcomes associated with mentoring relationships (Chun et al., 2012).

Mentor preparation has also been identified as an area where additional information may provide useful insights. Specifically, "from a subordinate's perspective, improving the quality of mentoring would also improve the quality of leadership experienced. More attention is needed regarding the apparent overlap between developing sound mentoring skills and leadership development" (Day, 2001, p. 595). Although previous research has attempted to identify the characteristics of effective mentors, the influence of support processes and broader contextual expectations associated with such processes are not well understood (Allen & Poteet, 1999).

Purpose & Research Questions

The purpose of this study was to develop an understanding of the role mentoring plays in a leadership development program focused on building leaders within faculty in Colleges of Agriculture and Life Sciences. The study was guided by the following research questions:

1. How are mentor/mentee relationships established?
2. What mentor processes are being used when they are not directed?
3. What role do mentors see themselves playing in developing mentees?
4. How can the mentoring process be supported and enhanced?

Methodology

Subjectivity Statement

The primary researcher for this study was Kevan Lamm a graduate student at the University of Florida pursuing a Ph.D. in Leadership Development within the Agricultural Education and Communication department. He has a master's degree in Leadership Development from the University of Florida and a Bachelor's degree in Mechanical Engineering from Colorado State University. Kevan serves as a program consultant to the LEAD21 program and completed the program as a participant observer in 2013. Prior to attending graduate school Kevan was a consultant and manager with a global consulting organization where he was responsible for conducting large scale training and human performance development activities with Fortune 500 organizations. Both Kevan's parents were faculty members and administrators at a large land grant university located in the western United States.

Epistemological and Theoretical Perspective

Constructionism was used as the epistemology for the study representing the "theory of knowledge embedded in the theoretical perspective and thereby in the methodology" (Crotty, 2003, p. 3). Constructionism was chosen because it identifies the participants as the constructors of knowledge and allows them to provide meaning to the phenomenon of interest, in this case mentoring (Crotty, 2003). The theoretical perspective chosen for the

study was constructivism (Koro-Ljungberg, Yendol-Hoppey, Smith, & Hayes, 2009). The theoretical perspective is the “philosophical stance informing the methodology... providing context for the process” (Crotty, 2003, p. 3). For this study, constructivism allowed the researchers to focus on the individual experiences of the participants and their role as mentors in a leadership development program.

Research Design

Based on the epistemological and theoretical perspectives identified, a generic or basic qualitative methodology was used (Merriam, 1988). The basic approach uses reoccurring patterns and themes to identify, describe and interpret the findings (Merriam, 1988). Ten participants were selected purposively. To be chosen, a participant had to serve as the mentor to a participant in LEAD21 during the 2013-14 Class IX experience. Participants were required to identify a mentor upon acceptance to the program and supply the organizers of the LEAD21 program with their name, contact information and position within their university system. Other than identifying who their mentor will be, the extent of the relationship was largely left up to the participant and their designated mentor. For data analysis purposes, identifying information was removed to ensure confidentiality. Mentors included eight men and two women. One mentor was the president of a land-grant university, two were deans, three were associate deans, three were department chairs, and one was a senior faculty member.

Semi-structured interviews were chosen as the data collection method for the study (Chalofsky, 1999). The one-on-one interviews were designed to be in-depth allowing for a personal experience where the researcher could build a rapport with the interviewee. Building rapport is essential to “establishing a safe and comfortable environment for sharing the interviewee’s personal experiences and attitudes as they actually occurred” (DiCicco-Bloom & Crabtree, 2006, p. 316). A 12-question interview guide was developed in accordance with the research questions as they aligned with Kram’s (1985) mentor role theory. While each participant was asked the same 12 questions, the researcher allowed the interviews to flow naturally, engaged in probes to engage the participant in extrapolation and provide detailed descriptions of experiences with their mentees to ensure rich data was collected (Merriam, 1988). The interviews were recorded with hand notes taken during the interview process to be used for triangulation purposes in the data analysis process. The interview recordings were transcribed and used as the primary source of data.

Content analysis was used to identify themes related to the research questions of interest. Content analysis is defined by Holsti (1969) as a process “carried out on the basis of explicitly formulated rules and procedures” (p. 3). The purpose of content analysis is to divide the data into categories *a priori* based on a theoretical model, in this case mentor role theory (Lincoln & Guba, 1985; Neuendorf, 2002), and allows for “reliable, valid inferences from qualitative data” (Krippendorff, 2013, p. 418). A review of mentor role theory was conducted prior to data analysis to identify the categories of interest. The coder then listened to the recordings and read through the transcripts twice prior to coding to become familiar with the material. The transcripts were then opened in the MAXQDA software program (MAXQDA, 2015) and meaningful words and phrases were identified as codes. An audit trail was kept throughout the process as additional emergent themes were identified and classified into groups (Lincoln & Guba, 1985).

At the completion of data analysis, the coder conducted a peer debrief with the other researchers to ensure the themes identified were correct. Peer debriefing was conducted to reduce research bias and ensure rigor (Lincoln & Guba, 1985; Mays & Pope, 1995). To ensure integrity and credibility is upheld it is imperative the researcher create an account of method and data which can stand independently so that another trained researcher could analyze the same data in the same way and come to essentially the same conclusions; and to produce a plausible and coherent explanation of the phenomenon under scrutiny (Mays & Pope, 1995, p. 110).

Lastly, member checking was conducted to ensure interpretation was correct and conveyed the information the participants intended (Lincoln & Guba, 1985). Upon completion of the data collection process, preliminary

findings were shared in a report and through a presentation.

Results

Establishment of mentor/mentee relationships

Mentors were asked to describe how they became involved with mentoring a LEAD21 participant. Responses tended to fall within two primary categories; first, there was an existing relationship with the participant; second, there was not an existing relationship, but the mentorship was requested by the participant or facilitated through an institutional process.

Mentors indicated that one of the primary ways they became involved as a mentor was based on a preexisting relationship they had with a participant. This was confirmed by one mentor who indicated, “we didn’t look at LEAD21 so much as creating a mentoring relationship because we already had one.” Another mentor told the story of the conversation he had with his mentee, “We knew each other and we had respected one another in the jobs that we’d done and he came to me and said you’ve been through it. I think this would be a good thing to do. Would you mind being my mentor? It was pretty straightforward.”

A second manner in which mentors indicated they had become involved was through a facilitated meeting with the participant due to a third party suggesting them as a mentor. One mentor reflected, “somebody in her department suggested that I might be somebody good to talk to about things.” Another mentor described a formal mentor matching process that their institution had initiated that included a planned mentor program where you work with the Associate Dean as opposed to just picking out someone else to work with. We feel it’s important if you’re mentored at that level, you’ll have access to conversations and to meetings you wouldn’t have if it was just maybe another faculty doing the mentoring.

A third manner that was indicated could be described as a hybrid of the two previous methods. Specifically, there may not have been an existing mentor relationship per se; however, there was a professional relationship through organizational hierarchy. One mentor indicated, “I was invited by one of our faculty members who comes from my home department.” This was very similar to the experience of several other mentors. For example, one mentor noted that their mentee was “one of our faculty, the Department Head who was in the program asked if I would serve in that capacity.” A novel relationship was “the person that I’m a mentor for was my former PhD student” indicating an ongoing relationship even though roles and relationship status may have evolved over time.

Processes being used as part of mentoring

Mentors indicated there were two main modes for meeting with their mentees: informal meetings that used a variety of communication channels or formal face-to-face regular meetings. The majority of mentors indicated they had an informal mentoring process. For example, one mentor described the process as, “When he has a question or needed some advice I was always open to meeting with him or talking to him. I mean we did some face-to-face meetings, we did phone calls, we did Facebook chat, emails, the whole nine yards.

A second mentor indicated, “my mentoring for LEAD21 has been much less structured and random.” Based on the nature of preexisting relationships, several mentors indicated the mentoring process was really just an extension of their established conversations. For example, one mentor said, “it’s really just sort of being able to expand and extend our dialogue that we’ve had for several years.” A second mentor shared a similar process, reflecting that they “tried to use a combination of things. We’ve done lunch... phone calls, emails, every way that you can communicate, he and I have always had that sort of relationship.”

A second group of mentors indicated their mentoring process involved formal and informal components. One mentor stated,

Well it was not terribly structured and we certainly met a couple of times on campus...we used the opportunity of travelling together to the conference, hanging around waiting for flights, breaks at the conference, you know an occasional meal here and there to talk about some process issues related to what she was learning as a result of participating in the sessions.”

A secondary theme was a tendency to begin with regular meetings, and then for the meetings to become less frequent or structured over time, for example, one mentor stated “...it varies. I would say probably early on when he was in the program it was probably every three to four weeks and lately it’s been maybe more like every six to eight weeks.”

A smaller group of mentors indicated they had a formal process they used throughout the program. One mentor indicated, “I invite him to all our administrative team meetings and he probably came to ninety percent of them...more specifically, he and I met on a monthly basis.” A second mentor described a similar process where regular meetings were supplemented with exposure to administrative meetings and activities. He described their process as,

If we have an academic affairs event we would ask them to attend...I wouldn’t call it shadowing but we have the opportunity for them to be at meetings as LEAD21 faculty where they wouldn’t ordinarily...We have them attend our Administrative Council meetings, not so much mentoring but they can sit-in and hear the Deans and Department Heads’ conversations. We also have an Advisory Council, which is a council that advises our Dean...between the dinners and the Council meetings and the individual meetings with us they have about two meetings a month.

Role of mentors in development

Mentors were asked to provide their insights into what role the mentor/mentee relationship played in developing their mentees. There were three primary themes that emerged when mentors discussed how the mentoring relationship developed their mentees. First, some mentors felt the mentoring process gave mentees an opportunity to gain insights into administrative career paths. Second, a group of mentors indicated the mentoring process gave mentees an opportunity to reflect and learn about themselves. A final group of mentors indicated they were unsure about the value that the mentoring process had on their mentees.

From an operational perspective, the most recurrent theme amongst the mentors was that the mentoring relationship developed mentees by providing them career insights. For example, one mentor indicated, I think it’s been very good. We’ve had long conversations about his career path because he wants to be an administrator. That’s his goal...I’ve been able to help him develop a professional strategy at some point moving to administration at a time that he will be successful.

A second mentor said,

probably the biggest or the most important part of that would be making sure that after the experience is over that they do have an opportunity to talk about it...there’s a fair amount of mobility if you want to be mobile in administrative positions.

As an extension of the administrative discussions, some mentors had even found opportunities for their mentees. For example, one mentor stated, “what I’ve been able to do is give him opportunities to lead.”

A second theme that emerged from the mentors is the mentoring relationship provided mentees an opportunity to learn more about themselves. One mentor said, “I think that’s pretty invaluable because it is different than a supervision type of relationship. It affords a lot more opportunity to really talk about things that they’re struggling with, that they find challenging.” A second mentor indicated,

I think given the structure of the program...it gave a participant somebody to visit with about the program, share their thoughts about what the value was being extracted from the program and to just visit about some of the opportunities that they saw coming from the program for their own application.

A secondary theme that emerged was how mentorship can help a mentee better understand the land grant system and their role within it. For example, one mentor stated,

He understands the land-grant is more than just a college of Ag. It is about how you serve a society ...How do we have an impact on the State. I think he really understands the full context of what a land-grant is.

A final theme that emerged was around mentors being unsure about the outcomes associated with the mentoring process. For example, one mentor stated, "You know I honestly can't say. It's like asking the question what good did your third grade teacher do you?" A reason why mentors were unable to identify the value of the relationship was sometimes attributed to lacking a specific conversation on the topic. For example, one mentor said,

I think the mentor/mentee at some point should have a discussion about what they want out of the relationship and we haven't had that. What do you want as the mentee? Where do you see yourself administratively? Do you see yourself continuing to move upward?

A second mentor had a similar experience, "I'd like to think it was very positive but I guess he and I have never specifically sat down and talked about that either." The mentors, as administrators, were very busy and sometimes quantifying value was not a priority. For example, one mentor stated, "Administratively we're very busy in our college," a second mentor indicated, "I don't think at present that we've had a culture of in fact looking at that on a systematic basis."

Supporting and enhancing the mentoring process

Mentors were asked what they would change about the mentoring process. The most resounding theme across mentors was the lack of a set of expectations for the process was a limitation. One mentor summed up the process as, "I was the first person to ask- 'are there any specific requirements or guidelines or outcomes' and he told me it's a kind of up to us."

In particular, several mentors expressed a desire for a more formal structure for the process. For example, one mentor stated, "I think having more structure around... the expectations of the program or the expectations of the mentee or the mentor or both would be helpful." A second mentor had similar feedback when they stated, "making it a bit more formal and [defining] what the expectations were for us." Another mentor indicated a desire for mentor training when they suggested,

there probably could be some coaching of the mentors as to what role the mentor is supposed to play in the process. We made it up...but I was depending on [my mentee] to help me understand the value that I could have created.

A second theme emerged around the logistics of the process. For example, one mentor said they could have had more meetings when they reflected that they could have,

Probably inserted a few more meetings during the course of the year to be sure that we cover certain things, just to make sure she had everything that she needed and all opportunities were provided for her to really consider what this meant for her and how she might be able to use what she has got out of the program and apply it.

A second mentor expressed a need for more face-to-face interaction when they stated, "I think you have to get real face time, real one on one meetings to make it work. Email and stuff like that doesn't necessarily engage them." Another mentor suggested a change to the expectations associated with program participants in their role

suggesting that “maybe it’s encouraging administrators to build in a couple of extra days of professional leave when they come back or something along those lines that helps.” An additional recommendation was to include a project component to the program. On mentor stated, “I think that if they worked on a project they could get advising and support from a mentor to help them pull that project together.”

In addition to the constructive feedback about the process from some mentors, a minority group of mentors felt like the process worked well. For example, one mentor stated, “I’ve been pleased with it. I think we’ve got it fine-tuned.” A second mentor had a more philosophical view on the mentorship process when they stated, I think that’s what’s nice about mentoring. You’ve got to practice it and when you practice it enough hours, and with enough opportunities, you know you get better with it like you would anything else in life. So I feel really good about the mentoring and advice I can give people now because it’s based upon a lot of experiences and opportunities I’ve had to just put myself out there.

Mentors were also asked what types of resources would assist them in further developing their mentor/mentee relationship. There were several themes that emerged regarding what resources would help. One primary theme was it would be useful to have session agendas or a program curriculum to provide context. A second primary theme was to establish a set of guidelines or expectations for the mentoring relationship.

Numerous mentors indicated that having a better idea of what was happening during the sessions would be helpful in directing their mentoring conversations. One mentor indicated, “If I, as a mentor, had a better idea of the framework and what the mentee was experiencing on the training side, I would have an opportunity to be a bit more formal in terms of structuring some discussions or dialogue.” A second mentor suggested expanding the scope of what is communicated to better inform mentoring conversations, stating Whomever is communicating with people identified as mentors should help them understand what LEAD21 is targeting, what is the goal of the program, content, what are the objectives...So, that there is a closer connection and synergy between the mentoring program and what is happening in these three, week long sessions.

A second primary theme was the desire for some sort of formalized expectations for the mentoring relationship. Some mentors indicated a preference for a form or document with expectations. For example, one mentor suggested,

Well one thing would be if there is a handbook or just a few pages something called ‘Guidelines’ or ‘Expectations of a mentor’. You know some kind of contract. It doesn’t have to be very serious but if they could develop what are some of the ideas, suggestions, a template, activities, expectations of the mentor mentee relationship coming out of the LEAD21...It’s kind of codified so they know what to expect and the mentor knows that if they accept this person it’s reasonable for them to come by.

However, numerous mentors indicated a preference for a conference call to communicate expectations, stating in fact it would be better to do it as a conference call rather than a letter or some kind of a paper thing because I’m busy too and so making me take time to read through that would be more challenging. If you had me on the phone you’d have my attention.

Another mentor suggested, “I think once you get a mentor identified, having a conference call to communicate to them what the expectations are and how, from the program, the designers’ and managers’ perspective...What part this should play in achieving the program’s goals.”

In addition, one mentor suggested periodic conference calls for mentors, “Maybe if they just had a conference call with mentors or maybe there was some way in which all mentors could kind of you know hear how things were going, maybe just a conference call every now and then.” Another mentor suggested providing guidance to participants in selecting a mentor by offering “some potential advantages and disadvantages of selecting a

mentor that you know well versus a mentor that might be new.” Additionally, there was a request for assistance with showcasing the LEAD21 program, “anything we can do to promote or showcase the program amongst our other administrators would be helpful. I’m not sure what that would look like though.”

Conclusions

A number of themes emerged from the data that can inform future use of mentoring in an agricultural leadership program such as LEAD21. According to the responding mentors, the mentor/mentee relationship was generally established in one of two ways. First, the relationship was previously existing, meaning the mentor and mentee knew each other professionally or personally prior to the LEAD21 mentoring experience. Alternatively, the relationship was non-existing, meaning the mentee actively sought or was assigned a mentor that they did not know previously. Because the mentoring dyads were not organizationally designated, there were more opportunities for mentees to select mentors that they were either comfortable with or felt could help them. This approach was unlike what has been typically observed within previous mentoring research (McCauley & Douglas, 1998). However, the self-directed nature of the relationship also allowed for greater flexibility and provided insights regarding emergent mentoring relationships within an agricultural leadership development context (Day, 2001).

Consistent with Jones et al. (2014), mentors also indicated there tended to be two primary processes used for interacting with their mentee. Interactions were either formal or informal in nature. Formal interactions generally included structured meetings and scheduled check-ins. Informal interactions consisted of ad hoc meetings, or linking LEAD21 discussions to other work activity. The results of this study seem to contradict those observed by Ragins and Cotton (1999) regarding the influence of formality on mentoring relationship outcomes. In particular, in the current study less formal interactions tended to be associated with more subjective outcomes. There were fewer examples of mentors being able to clearly identify mentee benefits associated with the process.

Additionally, mentors tended to fall into two categories when asked how they see their role in developing mentees. Generally mentors either indicated they saw their role as being subjective or objective in the outcomes associated with their mentee and the mentoring process more broadly. Mentors that tended to have a more objective perspective identified the need to provide mentees with career insights and to learn more about themselves. These career and psychosocial functions would seem to align closely to the functions identified by Kram (1985). However, a second primary theme emerged that was more subjective in nature. In particular, some mentors were unclear about the intended outcomes associated with the mentoring relationship.

Based on the themes identified with the interview process a conceptual model linking the nature of the mentoring relationship to the structure and outcomes associated with the process has been developed and can be viewed in Figure 1. Specifically, when mentors indicated there was an existing relationship with their mentees the structure of their interactions tended to be non-formal with more subjective, or non-specific, outcomes associated with the process. To the contrary, when mentors did not have a previously existing relationship with mentees the structure of the process tended to be more intentional and formal. Additionally, mentors were able to articulate more objective outcomes associated with the mentoring relationship.

	Relationship	
	Existing	Non-Existing
Structure	Non-formal	Formal
Outcome	Subjective	Objective
Support and Enhance	Formal Set of Expectations	
	Access to Program Curriculum	

Figure 1. Mentoring within a leadership development program conceptual framework

Although mentor responses regarding structure and outcomes could generally be categorized according to whether a previously existing relationship with their mentee existed, lines of categorical delineation were less evident regarding mentors responses around supporting and enhancing the mentoring process. For example, mentors from both relationship categories indicated a desire for a more formalized set of expectations. Additionally, mentors tended to agree that access to the program curriculum would help to guide the mentoring process. For example, knowing what content areas were covered during a particular seminar would help to inform what information should be discussed during subsequent mentoring interactions. The structural themes provide insights on the order proposed by Allen and Poteet (1999) and should continue to provide guidance regarding the most effective methods to deliver educational interventions including leadership development through mentorship in this context.

Implications and Recommendations

According to the themes that emerged from the data a number of implications and recommendations for the use of mentoring to enhance leadership development programs have been identified. However, the transferability of the implications and recommendations should be considered within the context of the research (Lincoln & Guba, 1985). The data analyzed here was collected from mentors involved in a large national agricultural leadership development program for individuals that are employed at various organizations where mentors are purposively selected by mentees.

First, participants of leadership development programs should be encouraged to select a mentor with whom they do not already have an established relationship. Chances are there are a myriad of individuals willing to serve in a mentoring capacity, so reaching out to build new relationships can only add to their network. In addition, they will receive insight from a perspective they had not previously obtained. Ideally established leadership development programs may even be able to provide recommendations for mentors within or outside the home institution that fit these criteria. Additionally, participants should be encouraged to select a mentor that is only one or two levels above them within their institution (McCauley & Douglas, 1998). For example, a faculty member may want to use a department chair or an associate dean as a mentor rather than a Dean, Vice Provost or even a President of a University. The responses obtained from this research revealed the mentors closer in position to the participant were more easily able to provide suggestions for leadership roles and moving up in rank.

From a programmatic and structural perspective mentors would like to receive an introductory email welcoming them to the LEAD21. This email should include a brief introduction, an outline of what is being covered at each session and possible questions they could discuss with their mentee. Guidelines or best practices for being a mentor should also be included. After establishing the mentoring relationship, mentors should receive updates

on what was covered at the end of each session from the LEAD21 staff so they know what to discuss with their mentees upon their return. This ongoing communication should assist in making the information mentees received at the session more relevant upon returning to their roles at their institutions.

Another recommendation would be to consider sharing a list of LEAD21 participants and mentors. While LEAD21 participants have the opportunity to build a network amongst their peers, there is also an opportunity for mentors to establish relationships with others engaged in the mentoring program. Benefits to mentors could aid in participation and perceived value to all engaged in the process (Hunt & Michael, 1983). For example, an optional conference call to discuss expectations and welcome mentors to the program would also provide an opportunity for networking and establishing rapport with the group.

Finally, results from the LEAD21, including success stories should be shared with mentors in the form of brief reports or marketing pieces. These results may help to provide tangible outcomes associated with their efforts, but may also serve to help mentors promote the program within their institutions (Day, 2001). The results of this study indicated mentors believed in the program and were willing to engage in positive discussions to support its continuance but this communication and marketing capacity is currently being underutilized.

A limitation of the study is the relatively small number of mentors that were interviewed. From a qualitative perspective, the intent of the study was not been to identify empirical results that generalize across situations, rather it was to identify emergent themes within a particular learning context and to use such themes to identify trends and areas for future research. For example, a more comprehensive case study (Stake, 1995) or ethnographic (Fetterman, 2010) qualitative approach may yield more rich descriptions of experiences and outcomes associated with the mentoring process. Alternately, a quantitative study may be insightful in identifying expected mentee outcomes associated with the program and then using mentoring process variables, such as existing relationship status, as predictors.

Although mentoring has been established as a common practice in leadership development activities (Day, 2001) there also remain a number of aspects that require further exploration. The intent of this research has been to provide some illumination regarding the mentoring process within a particular educational environment and in so doing “deepen our understanding of effective teaching and learning processes” (Doerfert, 2011, p. 9).

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Exploring the Motivations of Competitors in the FFA Meats Evaluation Career Development Event

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Abstract

The intent of this exploratory study was to inventory the motivations of North Carolina FFA Meats Evaluation CDE competitors and investigate the relationship motivation has on performance. Participants (n= 93) completed a battery of motivational measures (achievement goals, grit, interest, self-efficacy, task value, and control beliefs) during the CDE that was then connected to their individual score in the contest. Students show high mastery-approach and performance-approach goal orientations, and rate “competition” as the primary motivator for participation in the CDE. Achievement goals, interest, self-efficacy, and control beliefs were all positively correlated to performance ($p < .05$). Females outperformed males and were more likely to be motivated by “competition”. Results indicate the need for future studies to compare different CDEs, and include the predictive power of motivational measures on performance.

Introduction/ Conceptual Framework

Career Development Events (CDEs) have long been an important part of the National FFA Organization. Even before the establishment of the Future Farmers of America in 1928, vocational high school students were invited to participate in the National Livestock Judging Contest at the American Royal Livestock Show in Kansas City, Missouri (Tenney, 1977). From these humble beginnings have emerged a comprehensive offering of 24 different CDEs and one activity, ranging from agricultural communications to veterinary science (National FFA Organization, 2015). Talbert and Balschweid (2006) noted the popularity of CDE participation by FFA members. They found that seven in ten FFA members had participated in a career development event at some level and 60% were involved in a CDE focusing on leadership skills. This popularity of CDE participation can provide FFA members with valuable skills such as goal setting, dedication to the completion of tasks, and a desire for excellence (Vaughn, Kieth, & Lockaby, 1999).

With the recognized benefits of competition, it is important to examine what factors motivate young people to participate in a variety of competitive events. Arnold, Meinhold, Skubinna, and Ashton (2007) investigated factors motivating 4-H members to participate in the county fair and concluded that the opportunity to have fun was the biggest motivator. Additionally, participants identified achieving goals, spending time with friends, and teamwork as encouraging factors. The factors that did not serve as motivators included fair premiums, qualifying for State Fair, and making a presentation. A study by Radhakrishna, Everhart, and Sinasky (2006) concluded that 4-H members had positive attitudes towards 4-H competitions. Furthermore, participants credited the competitive events with encouraging them to learn new things, engage in goal setting, acquire important life skills, and set high expectations for personal achievement (Radhakrishna et al., 2006). In an effort to gain an in-depth understanding of the benefits gained from competitive livestock exhibition, Davis, Kieth, Williams, and Frazee (2000) conducted interviews and observations with 4-H members, 4-H parents, 4-H advisors, and livestock show officials over the course of a livestock show season. The themes that emerged as benefits to participation in competitive livestock exhibition included the development of social relations, character and family relations, exposure to competition, opportunity to experience new cultures and environments, and financial support for future educational endeavors.

Croom, Moore, and Armbruster (2009) conducted a nationwide study of FFA CDE events surveying coaches and competitors. They concluded there was disagreement between coaches and competitors on the most

important reason for participation. Students identified relatedness to career goals as the most important factor for participation, while coaches identified competition as the primary motivator. The researchers also reported a significant difference between male and female students with regard to motivation. Females rated career choice higher than males, while males identified leadership development and scholarship awards higher than their female counterparts. The authors explain that perhaps students *get* interested in CDEs for the potential career growth, while coaches *stay* interested because of the competition. This is a plausible hypothesis that achievement goal theory can help unpack.

Lancaster, Knobloch, Jone, & Brady (2013) examined the motivational constructs of self-efficacy, task value, and career interest among participants of several livestock-based CDEs in Indiana. Although they confirmed part of the findings from Croom et al. (2009), the authors encourage future research to connect motivational constructs with performance in the event, an objective of the present study. An analysis of the training practices of the National FFA Livestock Judging CDE, Rayfield, Frazee, Brashears, and Lawver (2009) found “competitiveness” had the highest correlation (.342) of any other trait to performance. These were traits students identified as characteristics that led to them being selected as a member of the team. When used in a linear regression to predict performance in the event, only two recruitment factors (“competitiveness” and “good study skills”) yielded statistically significant results. This finding suggests that students who identify their competitive nature tend to outperform those who do not; a notion that will be tested by measuring achievement goals in the present study.

Achievement Goals

Elliot and McGregor (2001) conceptualize achievement goals in a 2x2 framework (Figure 1). Central to achievement goal theory is the notion of competence, which they divide into two dimensions: *definition* and *valence*. On the definition side of the framework, goals are either mastery (absolute/intrapersonal) or performance (normative); while on the valence side, goals are either approach (positive) or avoidance (negative). The combined framework provides four achievement goal profiles that helps to better understand the ways in which individuals are motivated in specific contexts: mastery-approach, performance-approach, mastery-avoidance, and performance-avoidance. Prior research suggests that mastery-approach (Elliot, McGregor, & Gable, 1999) and performance-approach goal orientations (Lopez, 1999) are positive predictors of performance in classroom settings. In contrast, performance avoidance goals are negative predictors of performance (Vansteenkiste, Simons, Lens, Soenes, Matos, & Lacante, 2004; Wolters, 2004).

		Definitions	
		Absolute/intrapersonal (mastery)	Normative (performance)
Valence	Positive (approaching success)	Mastery – approach goal	Performance – approach goal
	Negative (avoiding failure)	Mastery – avoidance goal	Performance – avoidance goal

Figure 1. The 2x2 achievement goal framework (Elliot & McGregor, 2001)

Grit

In an attempt to classify a motivational construct more “global” and long term than self-control, Duckworth Peterson, Matthews, & Kelly (2007) proposed the term *grit* to the literature. They define grit as “the perseverance and passion for long-term goals” careful to disassociate with the cognitive abilities of individuals.

Duckworth et al. argued that talent alone does not achieve difficult goals, but that goal attainment requires sustained and focused application of talent over time. Studies have linked grit to performance in spelling bees (Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011), performance and retention of novice teachers (Robertson-Kraft & Duckworth, 2014), and performance and graduation rates of USMA Cadets (Maddi, Matthews, Kelly, Villarreal, & White, 2012).

Interest, Self-Efficacy, Task Value, & Control Beliefs

Interest, in a motivation context, is the psychological state of engaging in a task (Hidi & Renninger, 2006) with implications not just on first exposure, but in also reengaging later. Task Value is distinct from other aspects of motivation, because it illustrates how useful students perceive a task rather than why they wish to engage in it (Pintrich, Smith, Garcia, & McKeachie, 1991). Task value helps capture the utility students find with a task, as well as whether they find it fun or enjoyable. Self-efficacy refers to the cognitive process of an individual assessing their ability to perform a domain specific task (Bandura, 1997). In the same vein, control beliefs characterize a student's expectation in their efforts to culminate into positive outcomes (Pintrich, et al., 1991).

Theoretical Framework

Self Determination Theory (SDT) is a broad motivation theory that helps to ground the many facets of motivation used in the present study (Figure 2). SDT indicates the behavior of individuals is predicated on three basic needs of competence, autonomy, and relatedness. In the specific context of how SDT manifests into patterns of behavior, Ryan and Deci (2000) differentiate SDT into three “regulatory styles” (ways to be motivated): amotivation, extrinsic motivation, and intrinsic motivation. In this model they describe a continuum of motivation. To the far left are those who are unmotivated. To the far right are individuals who are entirely intrinsically motivated (internal personal reasons). The categories in between, range from those who are extrinsically motivated (external rewards), or in the case of integration, both extrinsically and intrinsically motivated.

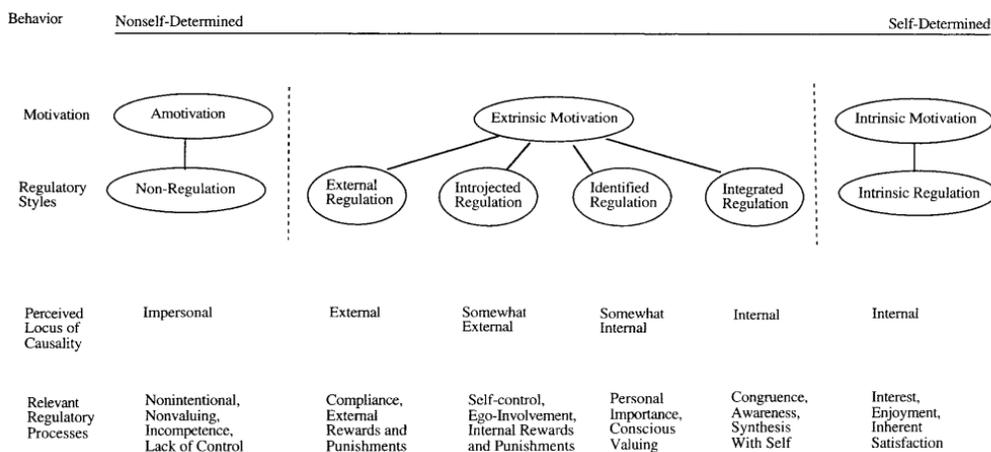


Figure 2. The Self Determination Continuum (Ryan, & Deci, 2000)

In this model, we can conceptualize the different students that compete in FFA CDE events. Amotivated and intrinsically motivated students are competing in CDEs, but it is likely most students engage in extracurricular CDE involvement because of a complex set of intrinsic and extrinsic rewards in the center of the model. The motivational measures included in this study attempts to unpack these layers of rewards in order to more fully understand why our students make the commitment to be part of CDE teams.

Purpose and Objectives

The purpose of this exploratory study, is to investigate what compels students to participate in the NC Meats Evaluation CDE. Specifically to identify the composition of their individual motivational profiles and what impact they have on performance in the event. This purpose aligns with the American Association for Agricultural Education's National Research Agenda Research Priority Area 5: Efficient and Effective Agricultural Education Programs (Doerfert, 2011).

Research Questions

1. What are the goal orientations of competitors in the NC Meats Evaluation CDE?
2. What are the relationships between motivational measures (goal orientations, grit, interest, self-efficacy, task value, and control beliefs) of competitors and performance in the NC Meats Evaluation CDE?
3. What are the primary motivators of students to participate in the NC Meats Evaluation CDE?

Procedures

The population for this study was all competitors that participated in the 2015 NC Meats Evaluation CDE. The questionnaire was included with the registration materials of all competitors provided at the start of the contest. Students were briefed at the beginning of the competition to read the assent form, which informed them that responding to the questionnaire was optional and would not impact their performance in the CDE. Competitors completed the survey during the CDE immediately after the written exam component of the event.

Survey instruments were pre-coded with competitor ID numbers in order to assign survey data to performance in the event. Content validity of the motivational instrument was determined by a panel of experts in both agricultural education and educational psychology. Data were analyzed with SPSS version 22. Descriptive statistics were used to report demographic information, and all motivation measures. Correlations were used to determine any relationship between motivation measures and performance. *T*-tests determined any differences between demographic variables on motivational measures and performance.

Measures

Motivations

Achievement Goals

Goal orientation was measured using the Elliot and Murayama (2008) Achievement Goals (ACQ-R). The questionnaire involved subscales of mastery-approach ($\alpha = .84$), mastery-avoidance ($\alpha = .88$), performance-approach ($\alpha = .92$), and performance avoidance ($\alpha = .94$) with individuals asked to rate 12 items on a 5-point Likert-type scale (1=*strongly disagree* to 5=*strongly agree*). Items were adapted to reflect the environment of a CDE competition rather than a "classroom."

Grit

As a measure of persistence, grit was measured with the short version Grit scale ($\alpha = .83$) (Duckworth & Quinn, 2009). The instrument contains eight Likert-type items (1=*not like me at all* to 5=*very much like me*) that measures the two components of grit: consistency of interest and perseverance of effort. Students in this research study received the "child adapted" version of the instrument.

Interest

Interest was measured with a modified version of the Initial Interest scale (Hulleman, Godes, Hendricks, & Harackiewicz, 2010) ($\alpha = .93$). The measure is comprised of five items on 7-point Likert-type scale (1=*strongly disagree* to 7=*strongly agree*) and were adapted to work in the context of a CDE competition.

Self-Efficacy

Self-efficacy was measured with a modified version of the Educational Psychology Self-Efficacy Questionnaire (Nietfeld, Cao, & Osborne, 2006). The measure ($\alpha = .90$) consists of eight items on a 5-point Likert-type scale (1=*nothing like me* to 5=*a great deal like me*) adapted to work in a CDE context.

Task Value

In order to ascertain to what extent competitors value the content material of the CDE, we utilized the task value construct of the MSLQ (Pintrich, et al., 1991). This measure contains six items on a 7-point Likert-type scale (1=*not at all true of me* to 7=*very true of me*) and was adapted to the context of a CDE competition ($\alpha = .90$).

Control Beliefs

To measure students perceived ability to exert control over their performance, we used the control beliefs construct of the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, et al., 1991) This measure contains six items on a 7-point Likert-type scale (1=*not at all true of me* to 7=*very true of me*) adapted to the context of a CDE competition ($\alpha = .68$).

Primary Motivation

In order to measure the motivations driving participation in a CDE, students were asked to rate the importance of several listed motivators in their decision to participate. Items were rated on a 5-option scale (1=*least important* to 5=*most important*). These items were adapted from a previous study of FFA CDE participants (Croom, Moore, & Armbuster, 2009).

Demographics

Demographic variables collected on competitors included: gender, current grade level, and race/ethnicity.

Performance

Performance was measured by individual score in the 2015 NC Meats Evaluation CDE. Competitors could earn a maximum of 500 points on the five components of the contest: written exam (100 pts), meat identification (200 pts), meat formulation problem (100 pts), meat judging (50 pts), and judging questions (50 pts).

Results

Ninety-three of the 128 students that competed in the 2015 NC Meats Evaluation CDE completed the survey (72.6% response rate). The majority of survey respondents were female (58.1%), white (87.1%), and junior or senior standing (75%). The motivation constructs used in this study show acceptable measures of internal consistency. Cronbach's alpha scores are included in Table 1 and Table 3.

Achievement Goals

Mean values for the four achievement goals are found in Table 1. Students rated performance-approach ($M = 4.34$, $SD = .68$) and mastery-approach ($M = 4.32$, $SD = .72$) as the two highest goal orientations. All goal orientations were positively related to performance ($p < .05$) with correlation coefficients found in Table 2.

Table 1

Summary statistics for achievement goals (n = 93)

	α	M	SD
Performance-approach	.77	4.34	.68
Mastery-approach	.71	4.32	.72
Performance-avoidance	.72	4.23	.86
Mastery-avoidance	.76	3.64	1.11

Table 2

Achievement goal correlations with CDE performance (n = 93)

		Mastery Approach	Mastery Avoidance	Performance Approach	Performance Avoidance
Individual	r	.22*	.24*	.25*	.23*
Score	Sig. (2-tailed)	.04	.02	.02	.03

Grit

Mean grit scores for all respondents was 3.7 ($SD = .60$). Our sample mean is comparable to average scores of adults, undergraduates, and spelling bee finalists (Duckworth, Peterson, Matthews, & Kelly 2007). However grit was not related to competitor performance in the Meats Evaluation CDE ($r = .002$, $p = .99$) (see Table 4).

Table 3

Summary statistics for motivational measures

	α	n	M	SD
Grit ^a	.77	93	3.71	.60
Interest ^b	.84	92	5.58	1.04
Self-Efficacy ^a	.84	93	3.92	.67
Task Value ^b	.95	91	4.88	1.53
Control Beliefs ^b	.85	91	5.46	1.43

Note: ^a Scale = 1-5

^b Scale = 1-7

Table 4

Motivational measure correlations with CDE performance

		Grit	Interest	Self-Efficacy	Task Value	Control Beliefs
Individual	r	.002	.32**	.25*	.17	.27*
Score	Sig. (2-tailed)	.99	.002	.01	.10	.01
	N	93	92	93	91	91

Interest, Task Value, Self-Efficacy, & Control Beliefs

Descriptive statistics for the remaining motivation instruments are found in Table 3. Among all of the motivational constructs measured, interest ($M= 5.58, SD= 1.04$) was the most strongly related to performance in the event. ($r = .32, p= .002$). Self-efficacy, and control beliefs were also significantly correlated to performance ($r= .25, p= .01$ and $r= .27, p= .01$ respectively). Task value ($M= 4.88, SD= 1.53$) was not related to performance ($r= .17, p=.10$).

Primary Motivators

Tasked with rating six common motivators on their decision to participate in the CDE, competitors ranked “competition” and “travel/fun” as the two greatest motivators (Table 5). Females ($M= 4.42, SD .69$) rated “competition” significantly higher ($t= -2.13, p= .036$) than males ($M=4.03, SD= 1.04$) (Table 6).

Table 5
Summary statistics for competitors’ decision to participate in CDE (n = 92)

	<i>M</i>	<i>SD</i>
Competition	4.25	.86
Travel/Fun	4.16	.84
Leadership Development	4.01	1.01
Scholarship Awards	3.78	1.16
Relates to SAE	2.88	1.44
Relates To Career Choice	2.77	1.38

Table 6
Gender differences on decision to participate in CDE

	Gender	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>
Competition	Male	37	4.03	1.04	-2.13*
	Female	53	4.42	.69	

Note: * $p < .05$

Performance

The mean individual score for all competitors ($n=128$) in the CDE was 253.17 ($SD=59.74$). Further analysis revealed that non respondents scored significantly different than respondents ($t=-3.77, p=.00$) as shown in Table 7. Females ($M=277, SD= 56.94$) outperformed males ($M=248.19, SD= 57.99$) ($t=2.35, p= .02$) on individual score for the event (Table 9).

Table 7

Respondent vs. Non-respondent performance in CDE

		<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>
Individual Score	Non-respondents	35	222.29	52.77	-3.77*
	Respondent	93	264.80	58.28	

Note: * $p < .05$

Table 8

Gender differences on performance in CDE

		<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>
Individual Score	Male	37	248.19	57.99	-2.35*
	Female	54	277.00	56.94	

Note: * $p < .05$

Discussion/Implications

Rayfield et al. (2009) linked the identification of a “competitive” attitude with performance in the event. Under achievement goal theory we might conceptualize this to mean that performance-approach oriented individuals would be more inclined to perform well in CDEs. This study supports these findings by demonstrating that a performance-approach goal orientation is positively correlated to performance. However all four achievement goals (avoidance orientation included) were positively associated with performance. More research is needed to decipher the predictive power of these goal orientations across different types of CDEs.

Despite grit being linked to performance in other contexts, (Robertson-Kraft & Duckworth, 2014; Duckworth et al., 2011) the present study shows no evidence that grit has an impact on the performance of competitors in a meats evaluation CDE. Grit levels of our sample were consistent with national populations, yet we saw no correlation that grittier individuals outperformed their less gritty counterparts. Assuming that grit is a non-academic, valid measure of persistence, it begs the question: why is there no relationship between grit and performance? Are the practice demands of teams competing for the NC meats evaluation contest not demanding enough to reveal an effect on those who thrive despite adversity? Is the meats evaluation CDE such a cognitive task that grit cannot help explain differences in performance?

Our findings on primary motivators conflict with those seen at the national level. Croom et al. (2009) reported that students rated “relates to career choice” as having the greatest impact on their decision to participate, with “competition” having the least impact. In the present study the exact opposite is true; students viewed “competition” having the greatest impact on their decisions to participate and relatedness to career choice as the least impactful. Is this a phenomena of a state level CDE? Perhaps this a function of the type/genre of SAE (animal science vs. plant science, vs. leadership etc.)? Future studies that inventory the different types of CDEs at different levels of competition could help explain why this discrepancy exists.

Caution should be used when interpreting these results, as they are not generalizable to all FFA CDE competitors. Although an attempt was made to survey all students in this CDE, 27.4% of competitors did not complete the motivation survey. Considering we found significant relationships between motivational measures and performance, it is concerning that there is a statistical difference between respondents and non-respondents on performance in the event. This warrants further investigation as to what degree of non-response error exists on the motivational data collected.

This exploratory study uncovers several connections between motivation and performance in a CDE. First, each of the four achievement goals (mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance) self-efficacy, interest, and control beliefs are all positively correlated to performance. Second, grit has no relationship with performance in a meats evaluation CDE. It is recommended that these motivational measures be included in a more representative study to analyze the predictive power of motivation on performance and the influence that coaches exert on their students.

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Analyzing Texas FFA as a Brand Using Instagram

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Abstract

Social media platforms provide agricultural organizations with an outlet for transparent communication. Transparent communication is used to shape an organization's public image and add value to the organization's brand. The purpose of this study was to explore Texas FFA as a brand through the analysis of Instagram posts uploaded by Texas FFA members. Posts ($n = 351$) were analyzed using David A. Aaker's (1992) brand equity assets. Corresponding likes and comments were excluded from analysis. Aaker's brand equity assets—brand loyalty, brand awareness, perceived quality, and other proprietary assets—were operationally defined using the FFA Brand Style Guide (2015). A majority of posts aligned with *perceived quality* and *brand awareness*. These findings indicate that Texas FFA members visually communicate ties to the FFA organization and place high importance on recognition of the FFA brand. Texas FFA members also posted several images that aligned with *other proprietary assets*. Thus, it is recommended that the FFA Brand Style Guide be revisited to expand upon expectations for social media use by FFA members. Further research is needed to investigate the entire FFA organization as a brand using a nationwide sample of FFA chapters.

Introduction

Social media is a permanent element in agriculture and will continue to gain importance in the future (White, Meyers, Doerfert, & Irlbeck, 2014). According to the American Business Association (ABM) Agri Media Council (2014), weekly usage of agriculture-related social media has increased from 8% in 2010 to 12% in 2014. Additionally, social media users 45 and younger are more likely to adopt social media practices and use agriculture-related social media over traditional channels (ABM Agri Media Council, 2014). Thus, as the younger generation of agriculturalists continue to adopt social media practices, the outlook for social media use within the agricultural industry is promising.

According to *Exploring Agriculturalists' use of Social Media for Agri-Marketing*, the “desire to speak on behalf of agriculture” (White, et al., 2014, p. 77) prompted participants to obtain a presence on social media. Agriculturalists and agricultural organizations who maintain a presence on social media are able to craft their public image through transparent communication (White, et al., 2014) and, as a result, are able to provide viewers with an inside look into different aspects of the agricultural industry.

Powerful organizations, as noted by Faber (2002), “are able to influence the ways in which others view them” (p. 36). Because of this, it is essential that organizations shape their public image through a variety of communicative genres (Kaplan & Haenlein, 2010; Hanna, Rohm, & Crittenden, 2011; McNely, 2012). Social media is one communicative genre that has entered a visual period (Bevins, 2014). According to McNely (2012), an organization's social media presence is “central to fostering both internal identity and external image” (p. 1). Thus, the production and distribution of images is important (McNely, 2012). Additionally, agricultural organizations should maintain a visual presence on social media platforms to gain image-power. Image-power, as defined by Faber (2002), encompasses the ability of an organization to mold perceptions of individuals through visuals.

By communicating through visuals, Instagram is one social media platform that has the potential to increase image-power and shape the external image of an organization (McNely, 2012). Launched in 2010 (McNely, 2012), Instagram enables users to capture an image, develop a caption, and share the image on social media

platforms, quickly. The photo sharing application has been tremendously successful and, in 2011, Apple named Instagram “App of the Year” (McNely, 2012). Instagram offers “creativity, a community, interaction, [and] storytelling” (Bevins, 2014, p. 37). According to Bevins (2014), Instagram allows the end user receiving the photo to “interpret it [the photo] in a way that fits their needs” (p. 37), implying that Instagram’s success goes beyond the app’s photo sharing capability.

Instagram is a social media platform that organizations can use to enhance their brand and develop brand communities (Kaplan & Haenlein, 2010; Muniz & O’Guinn, 2010). Brand communities are non-geographically bound social organizations that can occur in both the physical and virtual world (Devasagayam, Buff, Aurand, & Judson, 2010; Muniz & O’Guinn, 2010). Additionally, brand communities bring together followers of a brand and are based upon social relationships among followers (Devasagayam, et al., 2010). When followers of a brand become members of a brand community, they identify more closely with the brand and “increase their engagement with brand-related communication” (Devasagayam, et al., 2010, p. 217). Therefore, it is important for agricultural organizations to maintain brand communities in an effort to increase engagement and a sense of community among members.

Texas FFA is an agricultural organization that consists of a virtual brand community. With more than 100,000 members (44% female and 56% male) statewide, Texas FFA is the “largest state association by membership” (Texas FFA Association, 2014, p. 1). Chartered in 1929, Texas FFA functions under the constitution of the National FFA Organization (Talbert & Balschweid, 2004). Combined with classroom instruction and supervised agricultural experience’s (SAE) (Texas FFA Association, 2014), FFA “makes a positive difference in the lives of students by developing their potential for premier leadership, personal growth, and career success” (FFA Brand Style Guide, 2015, p. 8).

Because Texas FFA is “a[n] organization of, by and for the students” (Texas FFA Association, 2014, p. 1), it is important to understand how students involved in Texas FFA choose to represent the organization, socially. In turn, how students choose to represent Texas FFA contributes significantly to the organization’s brand community and, therefore, has an impact on the overall image of the FFA organization.

Conceptual Framework

Brand communities facilitate relationships between customers and brands. Because of this, it is important to understand the customer/brand relationship. The phrase *brand equity* resulted from “an attempt to define the relationship between customers and brands” (Wood, 2000, p. 662). Brand equity is (a) a measure of the strength of consumers’ attachment to a brand and (b) a description of the associations and beliefs the customer has about the brand (Feldwick, 1996; Wood, 2000). In 1992, David A. Aaker identified five brand equity assets that create value for a brand. The assets are (1) brand loyalty, (2) brand name awareness, (3) perceived quality, (4) brand associations, and (5) other proprietary brand assets (Aaker, 1992). The five brand assets, as depicted in Figure 1, work together to not only provide value to the organization itself but also to its customers (Aaker, 1992).

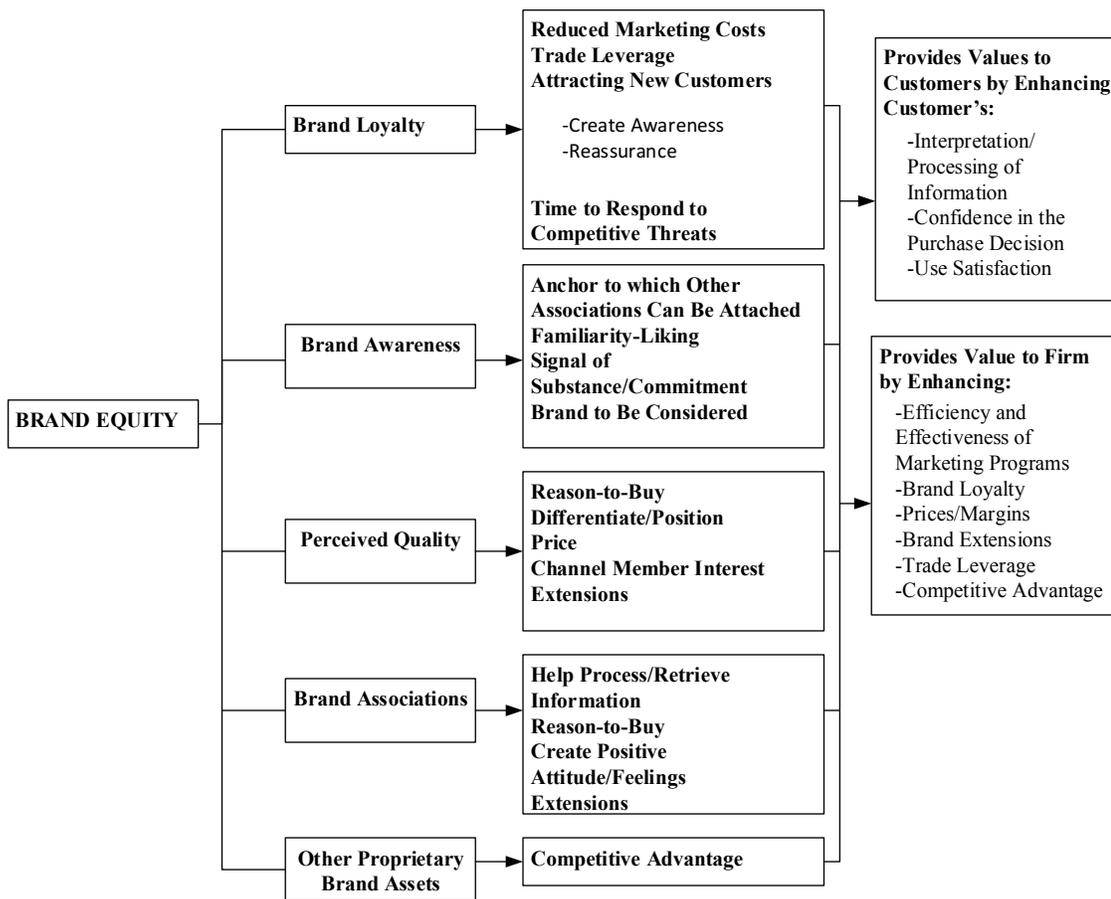


Figure 1: “How Brand Equity Generates Value” David A. Aaker (1992, p. 29)

The first asset, brand loyalty, “is a core dimension of brand equity” (Aaker, 1996, p. 105) and is exemplified through an organization’s customer base. It is no secret that customer retention increases the profitability of an organization since it is less costly to retain existing customers than it is to obtain new ones (Aaker, 1992). Happy customers are less likely to look for alternative products/services and are more likely to promote the brand to others (Aaker, 1992). Therefore, brand loyalty and a strong, satisfied customer base adds value to a brand.

The second asset, brand name awareness, “can provide the brand with a sense of the familiar and a signal of substance and commitment” (Aaker, 1992, p. 30). Awareness is often described as the backbone of successful brands because brands are often chosen because of consumers’ familiarity and/or experience with the brand (Aaker, 1992). In general, awareness “can affect perceptions and attitudes” (Aaker, 1996, p. 114) about a brand. Consisting of customers’ ability to recognize and recall aspects of a certain brand, awareness has the power to sway customers’ loyalty to a brand (Aaker, 1996). Perceived quality, the third asset, is responsible for differentiating the brand from other, similar brands (Aaker, 1992). Moreover, perceived quality often provides customers with a reason to buy and rallies support for a higher price (Aaker, 1992). Perceived quality is responsible for drawing people in and is often measured by quality and consistency (Aaker, 1996). In turn, perceived quality sets the basis for comparison to other, similar brands (Aaker, 1996).

Also providing customers with a “reason to buy” (Aaker, 1992, p. 31), brand associations ultimately provide customers with a reason to stay. The fourth asset, brand associations, include “product attributes, customer benefits, uses, users, life-styles, product classes, competitors, and countries” (Aaker, 1992, p. 31). These associations often help customers interpret information and generate positive feelings about the brand over other

brands (Aaker, 1992). Aiding in “competitive advantage” (Aaker, 1992, p. 29) over similar brands, the other proprietary brand assets category is “included for completeness” (Aaker, 1992, p. 28) and encompasses all other aspects of the brand that lend towards brand equity.

Purpose/Objectives

The purpose of this study was to investigate the Texas FFA organization as a brand through the analysis of Instagram posts uploaded by Texas FFA members. The following research question and objectives guided this study:

How do Instagram posts uploaded by Texas FFA members align with Aaker’s brand asset categories?

1. Describe how the posts aligned with brand awareness.
2. Describe how the posts aligned with perceived quality.
3. Describe how the posts aligned with brand association.
4. Describe how the posts aligned with other proprietary brand assets.

Method

A content analysis was chosen to objectively, systematically, and qualitatively describe contents (Berelson, 1971; Krippendorff, 1980) of the @iamtexasffa Instagram account. Launched during the 2014 Texas FFA State Convention, the account was originally managed by Texas FFA state officers and was turned over to the first chapter on October 21, 2014. Out of 1020 active FFA chapters (Texas FFA Association, 2014), 25 were chosen to participate in this study and *Carry the Flag* for @iamtexasffa. Participating chapters were chosen via an application process. Advisor and chapter contact information was collected in the application, along with responses to open-ended questions structured to learn more about the chapter. Chapters that submitted *complete* applications were selected to participate in this study. An application was deemed complete if it included advisor and chapter contact information and well-articulated responses to all open-ended questions.

Posts uploaded to the @iamtexasffa Instagram account, by the selected Texas FFA chapter’s members, served as the data for this study. Data collection occurred over a 25 week period from October to April 2014. Members were encouraged to post three to five pictures per day within the guidelines provided. The guidelines encouraged members to post pictures of what Texas FFA meant to them and to only post photos that were an appropriate representation of their school and chapter. Additionally, members were asked to promote the account to their friends and encourage others to follow @iamtexasffa. Members were not allowed to change the password on the account. Effects, filters, borders, hashtags, and tagging was allowed.

Combined, participating chapters generated 404 posts. Only posts containing an individual picture or a collage of multiple pictures representing a single theme were included in this study. Graphics and posts containing a collage of multiple pictures of multiple themes were excluded from data analysis, resulting in a sample of 351 posts. All 351 posts were analyzed using David A. Aaker’s brand asset categories, outlined in the 1992 study, *The Value of Brand Equity*. The five brand assets that add value to a brand are (1) brand loyalty, (2) brand name awareness, (3) perceived quality, (4) brand associations, and (5) other proprietary brand assets. For the purposes of this study, Aaker’s (1992) brand assets were operationally defined using the FFA Brand Style Guide. The first asset, brand loyalty, is represented by an organization’s customer base (Aaker, 1992). Brand loyalty was defined as the captions, comments, and likes the posts received. However, since only the image/graphic within the Instagram post, not associated likes or comments, was used for analysis, brand loyalty was not investigated.

Brand awareness was defined as recognition of the brand. Elements to be considered in recognition of the Texas FFA brand include the FFA emblem, FFA colors, and words “FFA”. The FFA emblem consists of “the ear of

corn cross-section, the rising sun, the eagle, the owl, and the plow” (FFA Brand Style Guide, 2015, p. 30) and is most commonly found on the official FFA jacket, award and chapter banners, and promotional items for FFA. The official colors of FFA blue, yellow, and red, can be found on these items as well (FFA Brand Style Guide, 2015). According to the FFA Brand Style Guide, blue is the primary brand color with yellow serving as a secondary color and red as a tertiary color. Lastly, the abbreviation “FFA” assists in brand awareness because it calls attention to the brand.

Perceived quality was defined as the personality of FFA. According to the FFA Brand Style Guide (2015), the personality of FFA is (a) straightforward without any unnecessary fluff, (b) accessible, available, helpful and relatable, (c) encouraging and aspirational, (d) knowledgeable and trustworthy, and (e) steeped in tradition without being afraid of change. The FFA Brand Style Guide (2015) defined the personality of FFA as “hardworking, moral and ethical, trustworthy, and enthusiastic and spirited” (p. 15). Taking this information into account, subcategories were created for images coded as perceived quality. These subcategories included work, moral and ethical values, trustworthiness, and enthusiasm and spirit.

Brand associations was defined as the FFA Motto, also known as the voice of FFA (FFA Brand Style Guide, 2015). “Learning to Do, Doing to Learn, Earning to Live, Living to Serve” (FFA Brand Style Guide, 2015, p. 11) is the official motto of the FFA organization. The organization places a great emphasis on their motto stating, “it’s not only rooted in tradition, it’s woven into the fabric of our [FFA] organization” (FFA Brand Style Guide, 2015, p. 11). Because of this concept, subcategories were created for images coded as brand association. Subcategories included learning to do, doing to learn, earning to live, and living to serve.

Other proprietary brand assets was defined as any other assets that add value to the FFA brand. According to Aker (1992), other proprietary assets include anything that contributes to competitive advantage over similar brands. Therefore, FFA’s “most important brand asset” (FFA Brand Style Guide, 2015, p. 19) was taken into account. According to the FFA Brand Style Guide (2015), FFA members are the single most important asset to the FFA brand. Therefore, how Texas FFA members chose to represent their chapter and FFA as a whole was weighted heavily in the analysis of Texas FFA as a brand. Because of this, any posts that did not fall in line with brand awareness, perceived quality or brand associations were categorized as other proprietary brand assets.

A detailed coding manual including the operational definitions of Aaker’s (1992) brand assets was created by the primary data collectors to ensure uniformity and accuracy among the data coding process (Table 1). Because the likes and comments were not included in analysis, coders were presented with a challenge to fully understand the event or group of individuals presented in each post.

Table 1.

Coding Manual with Detailed Brand Asset Descriptions

Brand Asset	Description
Brand Awareness	Recognition of the brand including the FFA emblem, FFA colors, or “FFA”
Perceived Quality	Personality of FFA, including images that illustrate any of the following qualities: <i>work</i> (labor, awards, accomplishments), <i>moral and ethical values</i> (giving back, service to others, volunteer work), <i>trustworthiness</i> (demonstration of emotion, close embrace), and <i>enthusiasm and spirit</i> (the act of showing spirit, games, silly expressions/gestures)

Brand association	FFA Motto, “Learning to Do, Doing to Learn, Earning to Live, Living to Serve”: <i>learning to do</i> (educational setting, teaching, supervisor present/someone giving instruction), <i>doing to learn</i> (practicing or exhibiting a project or craft, no supervisor present), <i>earning to live</i> (fundraisers/sales, monetary reward), <i>living to serve</i> (service to others, volunteering)
Other Proprietary Brand Assets	Any other posts that do not fall in the brand awareness, perceived quality, or brand associations categories

Krippendorff (1980) noted that content analysis techniques are expected to be reliable and that scientific research requires the study’s process and its results to be understood by others. Therefore, to ensure reliability of the study, independent coding of a sample of 40 posts was compared—across primary data collectors—using Cronbach’s Kappa. The comparison resulted in an almost perfect (Altman, 1990) interrater agreement of 0.874. Additionally, a third coder was trained on the data coding procedure using the coding manual provided and practice sessions. The same sample of 40 posts was then coded by the additional coder and Cronbach’s Kappa was again used to determine reliability across all data collectors. A mean kappa score of 0.713 was obtained, equating a good agreement between coders (Altman, 1990). Thus, all 351 posts were then analyzed by the primary data collectors.

Results

Of the 351 Instagram posts analyzed, 230 (65.5%) were categorized into the brand awareness, perceived quality, or brand associations categories. The remaining 121 (34.6%) posts were categorized as other proprietary brand assets. It is important to note that 104 posts were coded in more than one category, meaning that the post exhibited several brand assets. The categorical distribution, along with examples of each asset, is displayed in Table 2.

Table 2.

Brand Assets Represented in Instagram Posts and Examples (n=351)

Brand Asset	<i>f</i>	%	Examples (Post #)
Brand Awareness	113	32.2	121, 153, 265, 315
Perceived Quality	131	37.3	19, 78, 157, 281
Brand Association	90	25.6	33, 52, 138, 172
Other Proprietary Brand Assets	121	34.3	154, 249, 180, 213, 81

How do Instagram posts uploaded by Texas FFA members align with Aaker’s brand asset categories?

Brand awareness was the third most frequently observed brand asset with 113 (32.2%) posts displaying the FFA emblem, colors, or letters “FFA.” Visual examples of the brand awareness category are shown in Figure 2.

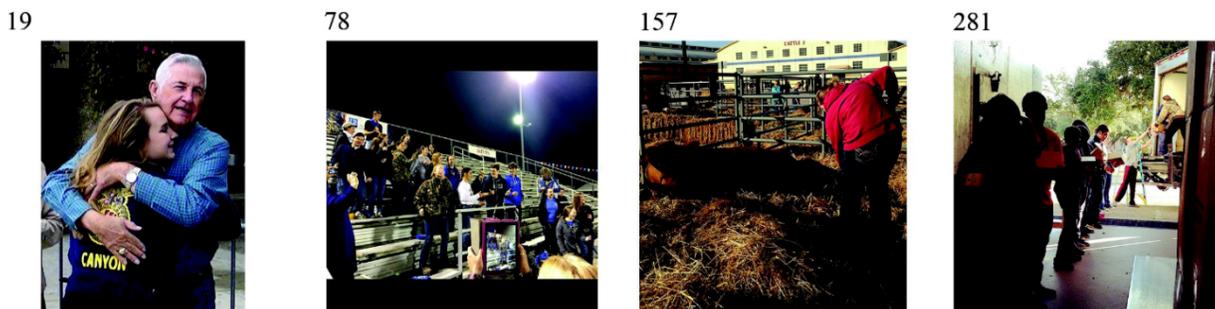
Figure 2: Examples of Posts Coded as Brand Awareness



Posts including the FFA jacket, such as post 121, were coded as brand awareness because the FFA jacket encompasses all aspects of the brand awareness category—the FFA emblem, colors, and letters “FFA”. Additionally, posts that included award pendants (265) and chapter banners (153) were coded as brand awareness because of the presence of the FFA emblem and colors. One FFA chapter was creative in their attempt to draw attention to the Texas FFA brand. Post 315 captured the letters “FFA” spelled out by chapter members and, therefore, was coded as brand awareness.

Of the four main coding categories, perceived quality—the personality of the FFA organization—ranked first with a total of 131 posts (37.3%). As mentioned previously, the perceived quality category was broken up into four sub categories—work, enthusiasm and spirit, moral and ethical values and trustworthiness. Visual examples of the brand awareness category are shown in Figure 3.

Figure 3: Examples of Posts Coded as Perceived Quality



Of the 131 posts, 92 (70.2%) were coded as work. Posts that included awards and displayed accomplishments were included in the work category since FFA members were rewarded for their work and effort. Post 157 shows a different side of the work category—labor—because the FFA member in the post appears to be cleaning up after her show animal by tidying up the tie-out area. Enthusiasm and spirit ranked second under perceived quality with 29 posts (22.1%). Post 78 is an example of enthusiasm and spirit because the members in the post appear to be making silly gestures and actively expressing enthusiasm through their mannerisms.

In the remaining categories, seven posts (5.3%) were coded as moral and ethical values and five posts (3.8%) were coded as trustworthiness. Post 281 is an example of moral and ethical values because the students in the post appear to be participating in volunteer work. Whereas, post 19 is an example of trustworthiness because the FFA member in the photo is expressing an emotion and is in a close embrace with another person.

Brand associations was defined as the FFA Motto, “Learning to Do, Doing to Learn, Earning to Live, Living to Serve” (FFA Brand Style Guide, 2015, p. 11). A total of 90 posts (25.6%) were coded as brand associations and

were further assigned to one of the following subcategories learning to do, doing to learn, earning to live and living to serve. Visual examples of the brand awareness category are shown in Figure 4.

Figure 4: Examples of Posts Coded as Brand Association

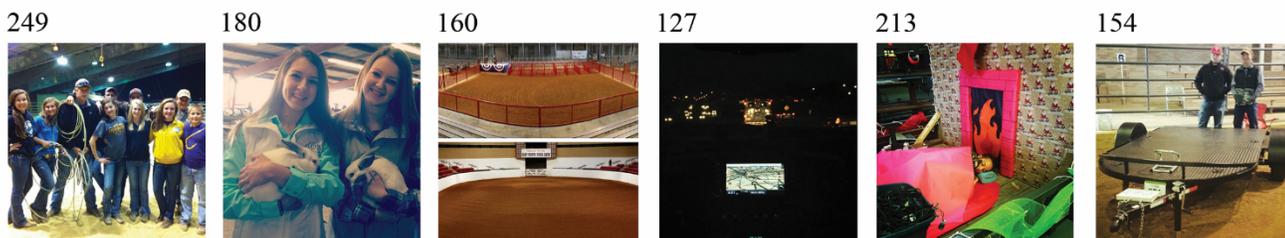


Of the 90 posts, two subcategories rose to the top—doing to learn and learning to do. Doing to learn was the dominant category with 57 posts (63.3%). Post 138 was coded as doing to learn because the post shows a member learning proper welding skills through application. Additionally, posts of FFA members exhibiting livestock were considered application of knowledge and, therefore, were coded as doing to learn. Learning to do ranked second with 22 posts (24.4%). Any posts that showed FFA members receiving guidance and instruction from a supervisor, while working on a project or in the classroom, were coded as learning to do. Post 33 would be an example of learning to do because the images within the collage show FFA members working on a project in a classroom setting and the finished project.

Although less dominant categories, living to serve and earning to live still yielded results. A total of eight posts (8.9%) were coded as living to serve and four posts (4.4%) were coded as earning to live. Post 52 is an example of living to serve because it shows an FFA member with a serviceman. Further, the post includes the image of an American flag and the patriotic colors, red, white, and blue. Post 178 is an example of earning to live because the FFA members in the post appear to be presented with a check. Any posts that included an obvious monetary reward or gift were coded as earning to live.

Posts that did not fit into the brand awareness, perceived quality or brand associations categories were coded as other proprietary brand assets. A total of 122 posts (34.3%) were coded in the “other” category. Additionally, the *other* category contained the second largest number of posts with several posts of the same theme. Therefore, six themes were identified by the primary researchers and deemed subcategories—visual examples are shown in Figure 5.

Figure 5: Examples of Posts Coded as Other Proprietary Brand Assets



Of the 122 posts in the *other* category, 55 (45.1%) were identified as a representation of a community. Posts coded in the community subcategory included images of groups of two or more people at an event or participating in an activity. The second largest number of posts, 33 (27.0%), were coded in the animals’ subcategory. The animals’ subcategory included photos of members (not participating in an activity) with animals and pictures of animals in general. The venue subcategory included 13 posts (10.7%) of locations with

the absence of individuals. For example, posts of empty livestock show arenas were coded in the venue subcategory. The travel subcategory, contained 8 posts (6.6%) of images of livestock trailers, FFA chapter transportation, or individuals in vehicles. Seven posts (5.7%) were placed in the individuals' subcategory because they included a single individual performing an act such as sleeping. Lastly, the products category contained 5 posts (4.1%) of member's completed projects without any other identifying information to determine the intention for the post.

Conclusions

According to the FFA Brand Style Guide (2015), FFA's most valuable brand asset is the members' of the FFA organization. Overall, selected FFA chapter members uploaded useful posts that contributed to the analysis of the Texas FFA Organization as a brand. All four of the brand assets used for analysis—brand association, perceived quality, brand awareness, and other proprietary brand assets—were represented across the Instagram posts uploaded by Texas FFA chapter members. Therefore, the Instagram account @iamtexasffa adds value to the Texas FFA brand.

Instagram posts uploaded by Texas FFA chapter members were placed in the perceived quality category, represented by the personality of the FFA—work, moral and ethical values, trustworthiness, enthusiasm and spirit—most frequently ($f = 131$). An overwhelming majority of posts reflecting the personality of the FFA displayed the work descriptor ($f = 92$), followed by enthusiasm and spirit ($f = 29$), moral and ethical values ($f = 7$), and trustworthiness ($f = 5$). Therefore, Texas FFA members place high importance on work and accomplishments.

Brand awareness, represented by the FFA emblem, colors, and “FFA,” was present in 113 posts. Because chapter members chose to showcase the FFA organization by posting images in their official dress, along with images that included the FFA emblem and colors, they showed strong affiliation with the FFA organization. This “familiarity-liking” (Aaker, 1992, p. 29) aspect of brand awareness is a result of a strong brand community. Congruent with Devasagayam, et al.'s 2010 conclusion, the @iamtexasffa Instagram account allowed Texas FFA brand community members to identify more closely with the Texas FFA brand. Brand association, represented by the FFA motto, “Learning to Do, Doing to Learn, Earning to Live, and Living to Serve,” was present in 90 posts. The doing to learn subcategory was most frequently observed ($f = 57$), followed by learning to do ($f = 22$), living to serve ($f = 8$), and earning to live ($f = 4$). Therefore, Texas FFA chapter members' placed high importance on learning and practicing skills and little importance on service to others and chapter fundraisers.

Of the 351 Instagram posts analyzed in this study, 121 posts could not justifiably be coded as brand awareness, perceived quality, or brand association—as operationally defined using the FFA Brand Style Guide (2015). Thus, the posts were coded as other proprietary brand assets. Six subcategories were created to best describe the posts in this category. The community subcategory contained the most posts ($f = 55$) followed by, animals ($f = 33$), venue ($f = 13$), travel ($f = 8$), individuals ($f = 7$), and products ($f = 5$). These results confirm Bevins' 2014 conclusion that Instagram goes beyond photo sharing, providing users with an outlet for community interaction and storytelling.

Recommendations

Because Instagram allows users to produce and distribute images, which McNeely (2012) deemed important to shaping an organizations image, FFA should continue to use Instagram at the local and national level to promote the FFA brand. Further, chapter advisors should encourage members to document all activities and tell

the story of FFA. Since Instagram allows for storytelling (Bevins, 2014), it is a great tool to use and is cost-effective.

Texas FFA members chose to frequently post images that aligned with the perceived quality category. Telling the story that work, accomplishments and enthusiasm and spirit are important to them. However, Texas FFA members leave room for improvement when telling the trustworthiness and moral and ethical values side of the story. This could be because coders had a difficult time legitimately assigning posts to the trustworthiness and moral and ethical values categories because the definitions in the FFA Brand Style Guide were determined to be too broad. Going forward, the FFA Brand Style Guide should be revisited and detailed definitions for what is perceived to be trustworthy, moral, and ethical by the National FFA Organization should be included. Further, the FFA Brand Style Guide should be extended to include social media. Specifically, how chapters and their members should represent themselves on social media. This can go as far as listing appropriate photo content because, as Bevins (2014) concluded, social media has entered into a visual period.

Much like the perceived quality category, the brand associations category yielded substantial results in doing to learn and learning to do. However, the earning to live and living to serve subcategories could use improvement. The data suggested that members place more emphasis on their projects and classroom activities rather than service to others and fundraisers for their chapter. This could be because chapter members failed to post on Instagram their service and fundraiser activities. Again, at a local level, chapter advisors should encourage members to document all activities and tell an accurate story of FFA. At the national level, the FFA Brand Style Guide should be updated to include the elements the organization wants to see on social media. Since “Earning to Live” and “Living to Serve” are important aspects of the FFA motto (National Brand Guide, 2015, p. 11), elements in relation to earning to live and living to serve should be included.

FFA is a national organization with a brand guide for the entire organization; however, this study was comprised only of Instagram posts by Texas FFA chapter members. Therefore, it is recommended future research be conducted on a nationwide sample of FFA chapters using Aaker’s brand assets. Also, only four of Aaker’s five brand assets were used in the analysis of this study. Future research is needed to analyze @iamtexasffa Instagram posts in relation to the fifth brand asset, brand loyalty. A study should be conducted to analyze the comments and captions of FFA member’s Instagram posts, in relation to brand loyalty, to better understand how they align with the Texas FFA brand.

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National FFA's Brand through the Eyes of Its Members: A Content Analysis

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Introduction

The rise of social media has changed the way businesses and organizations communicate their image. In fact, many integrated marketing communications now include a social media strategy (Mangold & Faulds, 2009). In addition, the use of images in social media is rapidly growing. According to Duggan (2013, p. 2), "54% of adult internet users post original photos or videos online that they themselves have created." Additionally, Instagram™ is a platform used by an increasing amount of mobile phone users (Duggan, 2013). Many companies have picked up on this trend and have started to use Instagram™ to develop their brand identity (McNely, 2012). Instagram™ is a mobile application for sharing photos and videos in a social network. According to its website, "Instagram™ is a fun and quirky way to share your life with friends through a series of pictures" (Instagram.com, 2015). There are more than 300 million Instagram™ users worldwide from various demographics and occupations. More than 2,500 of those users are corporate brands such as Nike, Adidas Originals, and Starbucks – currently the top three brands on Instagram™ (list.totems.co, 2015). These brands utilize Instagram™, as well as other social media outlets, to shape their brand image through visual communication. "The adoption of Instagram™ among professional organizations is significant in that it signals a mobile, visually predominant, ostensibly organic mode of sharing organizational images which differs qualitatively from professional photography in the support of branded communication" (McNely, 2012, p 1). McNely (2012) analyzed images from three organizations to determine how they were using Instagram™ to develop their brand. He used process coding to develop gerunds to represent how the organizations represented their brand. The six gerunds in which images were categorized into were orienting, humanizing, interacting, placemaking, showcasing, and crowdsourcing. Through the use of these gerunds, McNely was able to describe the use of Instagram™ to develop brand awareness. The methodology in McNely's (2012) study can be replicated to describe other organizations' use of Instagram™ to promote brand awareness.

Brand identity

Aaker (1996) defines brand identity using five general definitions, one of which being the following: "Brand identity is a unique set of brand associations that the brand strategist aspires to create or maintain. These associations represent what the brand stands for and imply a promise to customers from the organization members" (Aaker, 1996, p. 68). According to Aaker (1996), brand identity can be categorized as a product, organization, person, or symbol that is recognized and associated with the organization it represents. There are many organizations that use brand association for recognition and promotion. For example, the National FFA Organization is a student-led organization that can be identified by the FFA emblem, FFA colors (national blue and corn gold), and specific typography and typefaces (The National FFA Organization, 2015).

National FFA Organization

The National FFA Organization is the largest student-led organization in America. Its internal image is stated very clearly on the website, specifically in the National FFA Brand Guide. The mission of the National FFA Organization is to make 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 Organization, 2015). These three components of the National FFA mission are delivered on various platforms (Figure 1);

agricultural advocacy, agricultural knowledge, agricultural literacy, career exploration, food security, inclusion, leadership concepts, and service management. Within these platforms, the National FFA mission is delivered through various methods (Figure 1); awards and recognition, competitive events, conferences, conventions, educational resources, experiential learning, online experience, state association activities/events, and local chapter activities/events. Through student participation in the means of delivery, the National FFA Organization is preparing students to be future leaders in their chosen profession. Additionally, the FFA is promoting its internal image and educating students about sharing the internal image with external audiences.



Figure 2. Delivery of the FFA Mission (National FFA Organization, 2015)

Maintaining internal and external images

Through social media, organizations must work to consistently communicate their personal image to the public while the public also communicates its own perception of the organization through social media messages (McNely, 2012). These outside individuals have the ability to share their own perceptions of the organization’s image through social media and other mediums. In this way, an organization’s image is now molded and impacted by stakeholders of the organization.

One of the many advantages social media users have is that smart phones allow them to instantly create content from any location across the world (Duggan, 2013). These content creators (Duggan, 2013) can greatly affect the external image of a company or organization by simply sharing a message a message with the public on social media. Additionally, the follower interaction which social media creates allows users to repost content from other users making them content curators (Duggan, 2013) and further promoting outside influence of the organization’s image. The ability to easily impact an organization’s external image makes it necessary for the organization to monitor the messages being communicated to the public.

If organizations do not stay in front of the public message, their external image could quickly change from the internal image the organization wishes to communicate to the public’s image. “Organizations must work to achieve alignment between their internal identities—how they see and think of themselves in everyday practice—and external image—how *others* perceive the organization in everyday practice” (McNely, 2012, p 2). With more than 1.79 billion social media users in 2014 (www.statista.com, 2015), we can assume the external image of every organization will somehow be affected by social media activity. Maintaining an external image that accurately reflects the internal image of the organization takes a conscious and strategic effort (McNely, 2012). Organizations must always be at the forefront of their internal image and make sure they

are communicating the correct image with their external audiences. An organization's external image is developed and disseminated through their communicative genre ecology (McNely, 2012).

Purpose of the Study

The purpose of this content analysis is to describe and characterize the images posted by FFA members on the I Am Texas FFA Instagram™ account. By identifying the themes present in these images ($n = 399$), we determined what is important to FFA members about the organization. When a user chooses to share a picture, it shows something of interest to them (Silva et al, 2013). In this way, we identified what students' believe are important aspects of the FFA brand. The National FFA Brand Style Guide suggests four overarching photography categories for the FFA brand: 1) Farming 2) Technology/Education 3) Food Science and 4) Community/Leadership (National FFA Organization, 2015). However, we believe there is a difference in how FFA members visually display FFA and how FFA wants their brand to be displayed as mentioned in the National FFA Brand Style Guide (page 66).

With more than 610,000 members, National FFA's social media presence is not as extensive as some other large non-profit organizations. For example, *Charity Water* is a non-profit organization and, as of February 2015, has more than 220,000 Instagram™ followers and more than 1,200 posts. As of February, 2015, National FFA had 22,500 Instagram™ followers and with only 400 posts. If we assume all 22,500 of the users following @NationalFFA are FFA members, the organization reaching less than four percent of its members through Instagram™. While reviewing FFA's presence on Instagram™, we found much of the FFA related communication and interaction on Instagram™ comes from their stakeholders/members. This presented three main questions:

RQ1: What are FFA members portraying about the National FFA Organization by what they post to the I Am Texas FFA Instagram™ account?

RO1.1: Complete a content analysis of the images posted by FFA members on the I Am Texas FFA Instagram™ account

RO1.2 Define each gerund used by McNely (2012) in relation to the National FFA.

RO1.3: Categorize the images from the I Am Texas FFA Instagram™ account using the gerunds used by McNely (2012)

RQ2: What themes are present in the images posted by FFA members on the I Am Texas FFA Instagram™ account?

RO1.1: Analyze the images posted by FFA members on the I Am Texas FFA Instagram™ account

RO1.2: Identify the themes present in the images posted by FFA members on the I Am Texas FFA Instagram account

RQ3: Are FFA members accurately portraying the internal image of the National FFA Organization?

RO3.1: Compare the posts presented with the internal brand of the National FFA Organization and determine internal consistencies and differences.

RO3.2: Compare the themes present in the images posted by FFA members on the I Am Texas FFA Instagram™ account to the photography categories for the FFA brand described in the National FFA Organization Brand Style Guide (p. 66).

We combined the process coding technique used by McNelly (2012) and the information provided in Figure 1 to develop the coding instrument. In this way, we utilized a proven methodology designed for companies to analyze Instagram™ images displayed by a nonprofit youth organization.

Methods

Context of the Study

To gain an understanding of FFA members' opinion on what FFA means to them, we created an Instagram™ account for Texas FFA members to post images to the account relating to their experiences with FFA. In addition, the Instagram™ account was created for FFA chapters throughout Texas to display their FFA chapter spirit and communicate what FFA means to their chapter. Chapters were asked to "carry the flag" of the *I Am Texas FFA* Instagram™ account for one week and post 3-5 images per day. To participate, FFA chapters were required to fill out an online application on Qualtrics, an online survey development and distribution service. Chapters were selected based on the quality of their answers and their location. We made every effort to increase the diversity among the participating chapters by choosing chapters from different areas of the state. To raise awareness and increase participation, one researcher attended the 2014 Texas FFA Convention to promote the account to FFA members through handouts and student engagement. The purpose was to motivate FFA members to complete the application process for their chapter.

In an ideal situation, solely students would have completed the application and management of the account. However, as high school students are generally under the age of 18, it is assumed that FFA advisors assisted some students with the application and management process. Therefore, the data from this study illustrates how FFA members and their advisors portray the organization. We analyzed all images posted over a period of 25 weeks starting on October 21, 2014 with an exception of video posts and *I Am Texas FFA* promotional posts.

Design

This study is part of a larger content analysis study. As previously mentioned, the opportunity to participate in this study was promoted at the 2014 Texas State FFA Convention to all FFA chapters in the state of Texas. To apply, at least one member or advisor had to complete a short, online questionnaire. The questionnaire was created using Qualtrics, an online survey development and distribution service. The information gathered from these applications included: 1) the chapter's name and address, 2) the student's name and office or position, 3) the student's email address, 4) the advisor's name, 5) the advisor's email address, and 6) the advisor's phone number. The applicants were asked to answer the following questions: 1) Why does your chapter want to carry the flag for *I Am Texas FFA*? 2) What does FFA spirit look like? 3) Please describe the types of images that your chapter will post. 4) What makes your chapter unique from other Texas FFA Chapters? 5) Is there a specific time you request to carry the flag?

Chapters were selected based on their application and general interest in participating. If selected, the applicant received a congratulatory email with instructions on how to proceed and seven guidelines to follow. The following script was used in each congratulatory email:

Good evening [applicant],

Congratulations! [Chapter] FFA has been chosen to carry the flag for the @IAmTexasFFA Instagram™ account! You will be representing your chapter to over 1800 followers across the State of Texas.

Starting [date], you will have control of the Instagram™ account for one week (ending [date]). Please see your login credentials below. Before beginning your week of service, PLEASE make one post introducing your chapter!

A few guidelines:

- 1) Please post 3-5 images per day – images of what TX FFA means to you and your chapter.*
- 2) Please feel free to use filters, borders, hashtags, and tag people as you see fit.*
- 3) Please encourage chapter members to follow the account and promote it to their friends.*
- 4) Please be sure that all images are school appropriate.*
- 5) Please do NOT change the password of the account.*
- 6) This is your opportunity to show the rest of Texas why your FFA chapter is the best in the State!*
- 7) Attached is a PDF for advisors about using the account.*

Please let me know that you have received this email and if you are able to carry the flag for the week of [date].

If you have any questions or comments, I [the researcher] can be reached by email or phone (below).

Image selection

Images were accessed through Webstagram, an online interface that allows users to view certain statistics of their Instagram™ account. Webstagram was chosen because of the ease of access to a desktop computer. In contrast, Instagram™ is primarily a mobile device application and is not as user friendly on a desktop computer. Once the images were accessed through Webstagram, the images were printed, numbered, and cut out individually. The images selected for this study ($n = 399$) consisted of all images posted by Texas FFA chapters over a period of 25 weeks starting on October 21, 2014.

Coding instrument

The data were analyzed using process coding. Saldaña (2003) defines process coding as summative labeling of formative processes” (p. 48). In addition, process coding includes the process of developing gerunds to describe interactions and actions in images. We utilized the following gerunds developed by McNely (2012) to categorize and describe the images in this study: orienting, humanizing, interacting, placemaking, showcasing, and crowdsourcing.

The definitions presented by McNely (2012) were used to identify descriptors associated with FFA and listed those in column three of Table 1. The following instructional statement was included in the coding manual: *Please classify each image into one category using the following definitions. If the image can fit into more than one category, please categorize the image into the most dominant category. To categorize the image, place the number of the category in the corresponding cell in the attached Microsoft excel file. (i.e. To categorize a picture as humanizing, place a “2” in the cell that is labeled with the same number as each picture).*

Table 1.

Coding schema for Instagram™ use in organizations		
Process Category	Original Description (McNely , 2012)	National FFA Descriptors
Orienting (1)	Post provides audiences with a recognizable landmark or artifact that acts as a pivot related to organizational image; also includes tagging practices	The primary focus of the image is one of the following: FFA official dress FFA pins FFA emblem
Humanizing (2)	Post explicitly humanizes organizational identity by featuring a member of the org, or <i>performs</i> the organizational identity at human-scale; also: images of food, pets, or music as moves in humanizing the organization’s everyday	Supervised agricultural experience Leadership development events Career development events
Interacting (3)	Post displays explicit interaction with audiences, through an image itself, or in the comments thread	State and National FFA conferences Social group activities Educational activities
Placemaking (4)	Post involves an organization “placing” their identity within specific material locations as a way of reinforcing the organization’s core image	Images that promote or advertise FFA as a whole using at least one the following: FFA graphics FFA merchandise FFA advertisements
Showcasing (5)	Post involves the direct display of consumer products or goods for sale	Awards and recognition
Crowdsourcing (6)	Post includes the broad solicitation of feedback, participation, or other engagement with the organization through Instagram™ or another organization property	Other

Orienting. McNely (2012) described orienting as a post that provides audiences with a recognizable landmark or artifact that acts as a pivot related to an organization’s image. Orienting also includes photo-tagging practices such as using hashtags to better communicate the message the image is trying to illustrate. For the purposes of this study, orienting is related to images that include FFA official dress, FFA pins, and the FFA emblem. According to the National FFA (2015), FFA official dress for females include; a black skirt, white collared blouse, official FFA blue scarf, black dress shoes with a closed heel and toe, black nylon hosiery, an official FFA jacket zipped to the top, and a degree chain with State or American FFA degree (if applicable). FFA official dress for males includes; black slacks, white collared shirt, official FFA necktie, black dress shoes,

black socks, an official FFA jacket zipped to the top, and a degree chain with State or American FFA degree (if applicable). FFA pins represent the various degrees members can receive in the organization and are placed on the FFA jacket. According to the *FFA Official Manual* (2014), the National FFA emblem represents the history, goals and future of the FFA organization.

Humanizing. McNely (2012) describes humanizing as a post that explicitly humanizes the organization's identity by featuring a member of the organization. McNely (2012) also describes this category as a human *performing* the organization's identity with the use of food, pets, or music. For this study, we placed the following FFA related activities into the humanizing category; supervised agricultural experiences, leadership development events, and career development events. The FFA Official Manual (2014) describes supervised agricultural experiences as "programs that allow you [students] to apply knowledge and skills through experiential, service, and work-based learning opportunities." According to the Texas FFA website (www.Texasffa.org, 2015), leadership development events are described as: "Leadership development events focus on creating situations for members to demonstrate their abilities in public speaking, decision making, communication and their knowledge of agriculture and the FFA organization." According to the Texas FFA website (www.Texasffa.org, 2015), career development events are described as: "Career Development Events build on what is learned in agricultural classes and encourage members to put their knowledge into practice. These events are designed to help a member prepare for a career in agriculture by testing and challenging the student's technical, leadership, interpersonal and teamwork skills as well as their knowledge of the subject matter."

Interacting. McNely (2012) describes interacting as a post displaying explicit interaction with audiences. The post can be interacting through the image itself or in the comments posted about the image. For the purposes of this study, we did not analyze the comments attached to each image; therefore interaction was only measured according to the image itself. In reference to FFA, we identified the following events/activities as elements of interaction; state and national FFA conferences, social group activities (e.g. going to the movies, eating, playing games, etc.), and educational activities (e.g. agricultural science class activities, floral design, arts and crafts, etc.).

Placemaking. McNely (2012) describes placemaking as a post that involves an organization "placing" their identity within specific material locations. By doing this, the organization is reinforcing their core image. The FFA does not specifically identify their "core image". However, the FFA mission states that the "FFA makes a positive difference in the lives of students by developing their potential for premier leadership, personal growth, and career success through agricultural education" (FFA Official Manual, 2014). Therefore, we placed any images that contained graphics, merchandise, promotional materials, or advertisements related to FFA in the placemaking category. For example, an image of a quote from an FFA member explaining how FFA has had a positive influence on their lives would be placed in this category.

Showcasing. McNely (2012) describes showcasing as a "post [that] involves the direct display of consumer products or goods for sale." FFA is a non-profit organization in which members measure their success on the amount of awards and recognition they receive. With that said, we placed *awards and recognition* in the showcasing category.

Crowdsourcing. McNely (2012) describes crowdsourcing as a "post [that] includes the broad solicitation of feedback, participation, or other engagement with the organization through Instagram™ or another organization property." In other words, crowdsourcing posts are any posts that don't fall into any of the other five categories listed above.

Coding process

We first coded the images ($n = 399$) using the definitions in Table 1. Cohen's Kappa was used to measure the interrater agreement between us. Table 2 shows the scores for each process category. Viera and Garrett's interpretation of Kappa table (2005, p. 362) was used to analyze the Kappa scores in this study. Of the six categories, there was "substantial agreement" ($K = 0.41-0.60$) among us for the showcasing category ($K = 0.73$). The orienting category ($K = 0.69$) resulted in a "moderate agreement" ($K = 0.61-0.80$). The remaining four categories resulted in "fair agreement" ($K = 0.21-0.40$): humanizing ($K = 0.56$), placemaking ($K = 0.43$), interacting ($K = 0.34$), and crowdsourcing ($K = 0.33$).

Table 2.

Interrater reliability across a 6-code schema

Process Category	Cohen's Kappa
Showcasing	0.729
Orienting	0.691
Humanizing	0.561
Placemaking	0.425
Interacting	0.338
Crowdsourcing	0.332

We compared the individual sets of coding data and recoded the images with differentiating data. To ensure reliability of the study, we generated a random sample of 41 images from their combined data set and had two outside researchers code the 41 images independently. The two sets of coding data were compared using Fleiss Kappa resulting in an intercoder agreement of 0.772 across all six categories. Table 3 illustrates the Fleiss Kappa score for each category.

Table 3.

Intercoder reliability across 6-code schema

Process Category	Fleiss Kappa
Showcasing	1.000
Orienting	0.840
Humanizing	0.813
Crowdsourcing	0.594
Interacting	0.586
Placemaking	0.483

Researcher biases. We were both involved in FFA as high school students. In fact, one of the researchers served as the 2010-2011 Connecticut State FFA President. With that said, we both carry biases in the context of already knowing what FFA is and have a deep understanding of the organization's internal image. In addition, we can easily identify FFA related objects, events, and common phrases.

Results and Discussion

Images were categorized into the gerunds listed in the method section of this study. Figure 2 displays the percentage of posts per category as defined by us.

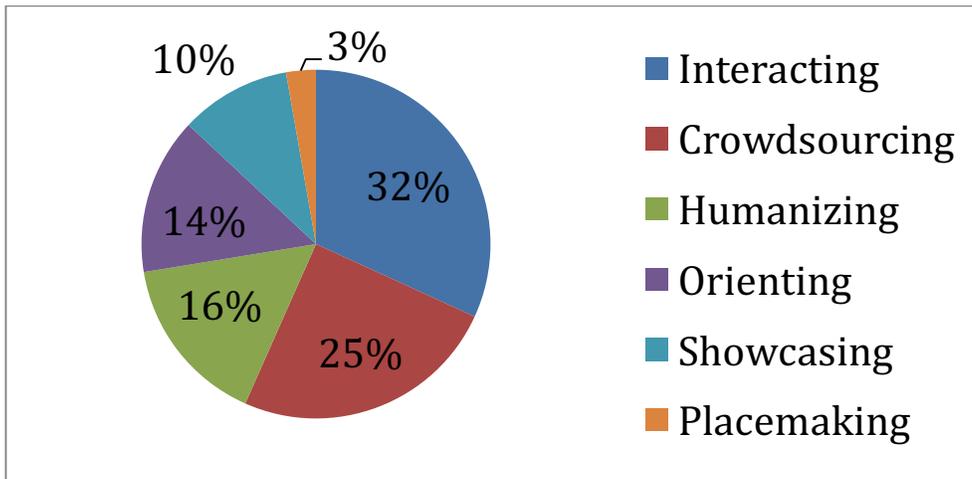


Figure 2. Percentage of posts per category

The data were analyzed and placed into gerunds based on the definitions listed in Table 1. As the kappa level was not significant, the data was analyzed again and a consensus was determined for the categorization of each picture. To determine reliability, two unbiased raters then determined inter-rater reliability. The data were tallied to determine the frequency of usage for each gerund. Figure 3 displays the distribution of gerund usage.

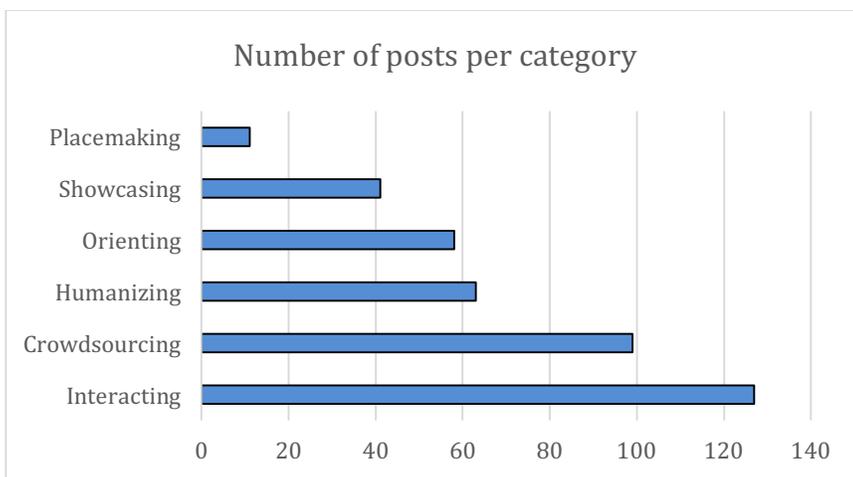


Figure 3. Number of posts per category

The more often a user posts something to social media, the more interest that item is to the user (Silva et al, 2013). Therefore, frequency of posts that fall into each gerund is important to understanding FFA chapter's value for different aspects of the National FFA Organization. After looking at the distribution, it can be determined which gerunds are most valued in representing the FFA brand.

Interacting. The gerund that had the most images displayed was the interacting gerund ($n = 127$). Images that were interacting were those that contained members engaging with each other (McNely, 2012). Images that reflected students interacting with each other, but not competing or showcasing their accomplishments were included in this gerund. Examples of this definition included general images of state and national FFA conferences, social group activities and educational activities. In all of the posts students were doing an activity. This gerund is indicative of the “Learning to Do and Doing to Learn” aspect of the FFA motto. Agricultural

education and the three-circle model (Croom, 2008) promote experiential learning. In this gerund, FFA chapters put a high level of importance on displaying the activities that they are doing.

Crowdsourcing. Images placed into the crowdsourcing gerund are those that seek feedback and engagement from the members (McNely, 2012). In addition, images that did not fit into any other category were included in this gerund. 24.81% of the 399 images were categorized as crowdsourcing ($n = 99$). As this gerund was the second most used gerund, we can infer that a large percentage of FFA members either 1) seek feedback and engagement when posting images related to FFA or, 2) are unclear as to what the organization represents or the mission they stand behind. The latter presents a potential problem for FFA and its organization's mission. If they aren't communicating their mission to their members clearly, their external image can be negatively affected.

Humanizing. McNely (2012) classifies images as humanizing, which help humanize the organization's identity. These images can include members performing the organization's identity using food, pets, or music. As the performing aspect of this gerund is important to its definition, images were only classified in this gerund if students were engaging in some type of competition or performance. This gerund includes supervised agricultural experiences, leadership development events, and career development events. The images in this gerund illustrate the three tenants of the National FFA mission. Through leadership development events, students are developing their potential for premier leadership, through career development events and supervised agricultural experiences, students are developing their potential for career success while personally growing in who they are as FFA members. In this way, the images categorized as humanizing ($n = 63$) represent the National FFA mission of premier leadership, personal growth, and career success.

Orienting. Images that are characterized as orienting provide a recognizable landmark or artifact that is important to the organization (McNely, 2012). These images help the audience identify with the post and thereby the organization. Through the images that were categorized in the orienting gerund ($n = 58$), the user is promoting the brand of the National FFA Organization. Aaker (1996) suggested that brand identity can consist of a symbol. The FFA emblem, jacket, and pins are symbols of the FFA recognizable throughout the entire country. The number of posts that fall into this gerund speaks to how well the National FFA communicates the symbolism of the organization to its members.

Showcasing. McNely (2012) describes showcasing as posts that showcase a product or good for sale. As the FFA is a nonprofit organization, they do not sell products or goods. Instead, they showcase their students receiving awards and recognition. The lack of images in this category ($n = 41$) speaks to the lack of importance which chapters are placing on this gerund and recognizing its members for their success in the organization. As winning is not a part of the FFA mission or motto, showcasing awards and recognition is important in building the brand up and drawing positive attention to the organization.

Placemaking. Images that involve an organization placing their material or identity in an unusual location were categorized as placemaking (McNely, 2012). Images that focused around FFA promotional materials and/or advertisements were included in this gerund. Images categorized as placemaking ($n = 11$) represent FFA members' understanding of brand promotion to external audiences. As FFA members seek to sell merchandise or wear it to represent their organizational pride, they are communicating the symbols of the organization to the public and impacting the external image of the organization. As this is the gerund with the lowest number of images, it illustrates that FFA members do not see Instagram™ as a platform to promote the brand of FFA to their external audience.

Recommendations

For the National FFA Organization. The data suggests that the National FFA is doing a good job of communicating the organization's brand to their members. The aspect of the brand that students are most often displaying on Instagram™ is the FFA Motto and the FFA Mission. The communication of this brand to chapters has been successful. However, the National FFA should improve chapters' awareness and education of the purpose and uses of different social media platforms by illustrating that purpose. The high percentage of images that fall into the crowdsourcing category ($n = 99$) suggests that chapters do not accurately understand the purpose of Instagram™ as their images are not conveying a clear message. Additionally, the low percentage of images that fall into the placemaking category ($n = 11$) also points to the lack of understanding among FFA chapters. Individual FFA chapters should be using Instagram™ to connect with internal and external audiences. The National FFA should provide material for agricultural science teachers to educate themselves and students about the different social media platforms and the most appropriate way to use those platforms to communicate the FFA brand with external audiences. Additionally, the National FFA should consider providing workshops at the National FFA Convention and State FFA Conventions that educate and empower students to promote their chapter and the organization through social media.

For Practice. Chapters should post images that clearly communicate a message and gather the attention of the audience. Chapters should be cognizant of the FFA Mission, Motto, and audiences that they are targeting when crafting a post for Instagram™. Additionally, FFA chapters should spend more time highlighting their accomplishments and displaying what makes them unique and special rather than seeking to engage the audience. FFA chapter should see Instagram™ as a tool to highlight their chapter to members, alumni, parents, and other stakeholders of the organization. Their posts should just seek to educate followers about the chapter rather than seek engagement or have a call to action from the Chapter. While chapters should use social media with a purpose, Instagram™ is a platform that FFA chapters can use with the purpose of bragging about who they are and what FFA does for members and the community.

For Future Research. This study creates a basis of research for future studies. Studies should be conducted that will build upon this research and will further the understanding of FFA's use of social media. Similar research studies should be conducted on other social media platforms to determine if the chapters are displaying the same message about FFA. Additionally, a study should be conducted to determine if those not familiar with the organization would characterize the images in the same fashion. Last but not least, a study could be conducted to determine if FFA chapters are displaying the same message through Instagram™ when they are not posting to the official I Am Texas FFA Instagram™ account.

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Description of Millennial and Non-millennial Agriculture Teachers' Current and Ideal Emphasis on the Three Components of the Agricultural Education Program

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Abstract

Classroom and laboratory instruction, FFA, and SAE have long represented the complete agricultural education program via the three-component model. While the model depicts three circles of equal size to represent these components, the focus and level of emphasis of each component within the agriculture program is the decision of the agriculture teacher. The purpose of this study was to describe Arkansas agriculture teachers' behavioral intentions and actual behaviors regarding emphasis of each component in the profession's three-component model. Results of this descriptive study indicated the average program emphasized instruction most, FFA next, and SAE least. However, the majority of respondents indicated a disparity between the emphasis of each component in their current program and their ideal program. Most respondents indicated their ideal program would emphasize instruction, FFA, and SAE equally. Differences between Millennial and Non-millennial teachers indicate the younger generation spent more time on FFA than the older generations, while the older generation wanted more personal time than their younger peers. We recommend further research be conducted to determine whether these results are found among other populations, as well as to uncover the reasons behind these results.

Introduction and Conceptual Framework

One of the most universally recognized foundations of school based agricultural education is its three-component model. Comprised of equal parts classroom and laboratory instruction, leadership development through the FFA, and hands-on application through supervised agricultural experiences (SAE), the three-component model displays the interrelationships and uniqueness of each component that, theoretically, makes up a comprehensive school based agricultural education program (Figure 1) (Croom, 2008; Hughes & Barrick, 1993; Moore, 2006; Phipps, Osborne, Dyer, & Ball, 2008).

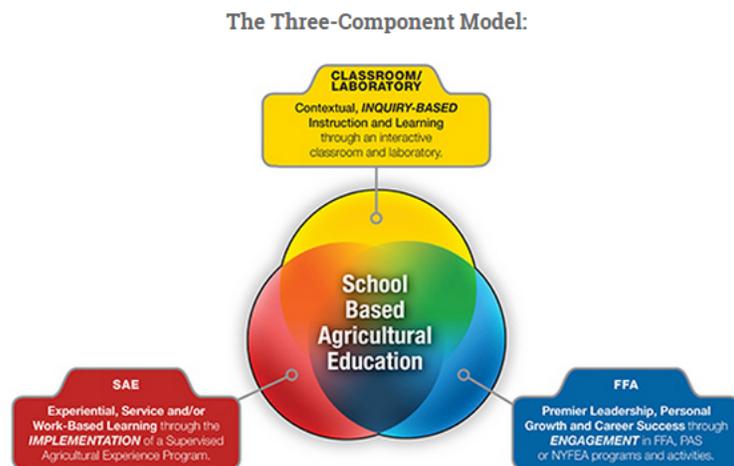


Figure 1. The three-component model of agricultural education (National FFA Organization, 2015).

The classroom and laboratory instruction component focuses on activities that enable students to gain knowledge regarding agricultural concepts and problems (Phipps, et al., 2008; Croom, 2008). Talbert, Vaughn, Croom, and Lee (2007) attributed this component to being the “foundation for everything else that occurs in the agricultural education program” (p. 107). Baker, Robinson, and Kolb (2012) posited the formal instruction

component of the agricultural education program was appropriate for exploring abstract concepts, as this component is devoted to formal instructional methods such as “lecture, demonstration, guided and independent practice, review, and assessment” (Croom, 2008, p. 110). Unlike other academic subjects, the agriculture teacher typically has numerous laboratories for instruction at his or her disposal, including mechanics facilities, greenhouses, landscaping areas, gardens, aquaculture tanks, livestock and equine facilities, crop fields, biotechnology laboratories, forestry plots, food science kitchens, orchards, and the like (Shoulders & Myers, 2012). Much of an agriculture teachers’ reputation among students, parents, and administrators stems from his or her qualities as an instructor; enthusiasm for teaching, commitment toward helping students learn, commitment toward teaching, enjoying teaching, structured classroom management, relevant teaching methods, and classroom organization have all been cited as characteristics of exemplary agriculture teachers (Larson, 1992; Luft & Thompson, 1995; Miller, Kahler, & Rheault, 1989; Roberts & Dyer, 2004).

SAE programs enable students to apply knowledge learned in the classroom to real-life situations through work-based learning experiences (Phipps, et al., 2008; Talbert, et al., 2007). Originating from the implementation of the home project by Rufus Stimson (Croom, 2008; Moore, 1988; Stimson, 1919), SAEs require students to maintain an educational plan that is supervised by the agriculture teacher outside of the school day (Croom, 2008). While SAE has traditionally been acknowledged as the experiential component of the agricultural education program (McLean & Camp, 2000), Baker, et al. (2012) posited SAE offers a culminating opportunity for achievement stemming from learning experiences had within each program component. Research has noted declines in students’ and teachers’ development and maintenance of SAEs over the past 30 years (Barrick, Hughes, & Baker, 1991; Dyer & Osborne, 1995; Dyer & Williams, 1997; Retallick & Martin, 2008; Rubenstein & Thoron, 2014). Changes in student attitudes and demographics, school structure, resource availability, image, the overall agricultural education system, and teacher and student motivations have been attributed to the reduction in SAE involvement (Dyer & Osborne, 1995; Retallick, 2010). In spite of the decline in participation, research has consistently reported the benefits of SAEs on knowledge acquisition (Arrington & Cheek, 1990; Pals, 1988; Ramsey, 2009; Williams, 1979) and on teachers’ high value toward SAEs (Lewis, Rayfield, & Moore, 2012; Robinson & Haynes, 2011).

The National FFA Organization offers membership to students in agricultural education classes in order to provide them with connecting activities between school and their lives that focus on developing leadership, personal growth, and career success (Talbert, et al., 2007; Phipps, et al., 2008). With competitive award structures for both the individual student and the chapter, the FFA is an intracurricular organization that, as the three-component model suggests, motivates students to display their knowledge and skills developed in the classroom and through their SAEs. Involvement in FFA activities has been linked to students having more enjoyable high school experiences (Rose, 2014), increased leadership skills (Wingenbach & Kahler, 1997), and increased life skills (Ahrens, Cox, Burris, & Dykes, 2015).

Teachers of agricultural education have been encouraged to adhere to the three-component model in their preservice and inservice programs by educators (Phipps, et al., 2008), legislation (Smith-Hughes Act, 1917), and established tradition (Croom, 2008). While Phipps, et al. (2008) stated teachers have adjusted the emphasis put on each of these three components as industry practices, educational priorities, and student needs have evolved, the model is typically represented by three circles of equal size (Croom, 2008; Lewis, et al., 2012; Talbert, et al., 2007; National FFA Organization, 2015), implying equal emphasis in the model agricultural education program.

While these three components have long represented the complete agricultural education program, the roles of an agriculture teacher are great and varied. Torres, Ulmer, and Aschenbrener (2008) found teachers divided their work hours between 11 roles; five being related to classroom and laboratory instruction, one being related to SAE management, three being related to FFA management, and the remaining two related to program management and professional activities. Their study reported 69% of teachers’ work hours were devoted to classroom instruction, 23% were devoted to FFA, and 3% were devoted to SAE. Experienced teachers spent an

average of 44.6 hours devoted to work per week, while first-year teachers spent an average of 49.4 hours devoted to work per week. Torres, et al. posited that extra work hours affected teachers' working conditions, which could contribute to job dissatisfaction.

Agricultural education programs within institutions of higher education bear the responsibility of preparing high quality agriculture teachers to lead successful agriculture programs within secondary school settings (Wardlow & Osborne, 2010). The National Research Agenda of the American Association of Agricultural Education (AAAE) recognized the development of "highly effective education programs...in all settings and at all levels" (Doerfert, 2011, p. 24) as an outcome of the profession. In 2001, the AAAE adopted the National Standards for Teacher Education in Agriculture; Standard 3 focused on the program's ability to "...retain an adequate supply of quality students who demonstrate potential for professional success in the agricultural education community" (AAAE, 2001, p. 4). Preparing quality agriculture teachers requires equipping them with the problem solving and planning skills necessary to balance the program's needs and priorities according to administrative, professional, and community expectations, which are specific to geographical regions and evolve over time (Phipps, et al., 2008).

The preparation of teachers today adds additional challenges related to generational differences. While no hard and fast rule regarding generation age ranges exists, Carlson (2008) identified Millennials as those individuals born after 1983 due to the increase in births starting in 1984, and before 2002 due to changes in American culture and political climate as a result of the terrorist attacks of September 11, 2001. The millennial generation, soon to be the largest generation within the teaching profession, is the first in four generations to omit "work ethic" from their list of characteristics they feel distinguishes them from others (Pew Research Center, 2010). Millennials are also less willing to tolerate unpleasant working conditions than previous generations, among which time allocation and flexibility are included (Center for Women and Business, 2013). The job of an agriculture teacher is often displayed as one that is physically, emotionally, and intellectually demanding, requiring more time, effort, and sacrifice than the typical career (Croom, 2003). These factors can contribute to teacher burnout, attrition, and ultimately, the decades-long teacher shortage found in agricultural education (Walker, Garton, & Kitchel, 2004).

Agriculture teachers operate programs with a relatively high degree of autonomy compared to teachers of other academic subjects; the focus of a program's instruction, SAE programs, and FFA events, as well as the degree to which each of these components is emphasized, is decided upon by the agriculture teacher (Talbert, et al., 2007). The recognized disparity between teachers' value of SAE programs and their implementation of SAE programs suggests teachers may not be equipped to navigate the complexities of shaping a program to align with their standards, potentially leading to job dissatisfaction. Numerous studies have focused on agriculture teachers' roles related to job satisfaction (Cano & Miller, 1992; Grady & Burnett, 1988; King, Rucker, & Duncan, 2013; Torres, et al., 2008); however, there is a gap in the literature regarding different generations of teachers' perceptions regarding ideal agriculture programs, as well as their abilities to shape their programs to meet those ideals.

Theoretical Framework

According to the theory of planned behavior, agriculture teachers enter and progress through the profession with behavioral intentions regarding leadership in the agriculture program (Ajzen, 1991). These intentions can only be acted upon if the person both perceives he or she can carry out the behavior and if his or her ability to carry out the behavior is not thwarted by external factors outside of his or her control. In addition, intentions are influenced by an individual's attitude toward a behavior, which refers to "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question" (Ajzen, 1991, p. 188), and subjective norms, which refers to the individual's perception of the expectations of his or her social community. Thusfar, research has not explored agriculture teachers' behavioral intentions regarding the three-component

model and the focus of their programs, nor whether teachers are equipped with the skills, external factors, and community support to act on those intentions.

Beginning agriculture teachers typically enter the profession in one of two ways: a) the incoming teacher replaces a previous teacher who has either resigned or retired; or b) the incoming teacher enters a newly opened position, either in a multiple-teacher program or in a newly opened program. Regardless of the circumstances surrounding the entering teachers' new positions, all are immediately responsible for the development and focus of the school-based agriculture program, including courses, community relationships, school-related procedures, facilities, student growth and leadership events (Talbert, et al., 2007). The actions a teacher takes regarding the program's focus and development stem from his or her perceptions of his or her own abilities to lead the program in the intended manner, perceptions of the control he or she has over his or her program's focus, perceptions of his or her peers' expectations regarding the program, and his or her own attitudes regarding the program's focus. Therefore, the perhaps unintended display of a model program with three equal components may alter a teacher's perceptions of his or her peers' expectations, as well as his or her own attitudes regarding the program's focus.

Purpose and Objectives

The purpose of this study was to describe Arkansas agriculture teachers' behavioral intentions and actual behaviors regarding emphasis of each component in the profession's three-component model. In order to achieve this purpose, the following objectives were developed:

- to describe Arkansas agriculture teachers' perceptions of their emphasis on classroom and laboratory instruction, SAE, and FFA within their agriculture programs and their level of emphasis on their personal lives as compared to their emphasis on their programs;
- to describe Arkansas agriculture teachers' perceptions of their preferred emphasis on classroom and laboratory instruction, SAE, and FFA within their ideal agriculture programs and their preferred level of emphasis on their personal lives as compared to their emphasis on their programs;
- to describe the difference between agriculture programs led by Arkansas agriculture teachers of the millennial generation and those of other generations; and
- to describe the difference between the ideal agriculture programs of Arkansas agriculture teachers of the millennial generation and those of other generations.

Methods

This descriptive study utilized a researcher-developed instrument to gather teachers' perceptions regarding the emphasis they placed on classroom and laboratory instruction, FFA, and SAE in their current programs, as well as the emphasis they would place on each in their ideal programs. The population consisted of Arkansas agriculture teachers ($N = 248$) (Foster, Lawver, & Smith, 2014); the sampling frame consisted of teachers attending the state FFA career development events, which are held over a two-day period at the University of Arkansas ($n = 75$). While a more representative sampling frame, such as the state's email directory, would have been desirable, the instrument required respondents to create illustrations deemed too complex for electronic correspondence methods. We recommend researchers collect data with this instrument via mailed surveys as funding allows in the future, and we recognize the limited sampling frame used herein as a limitation of this study. Responses were received from 32 teachers, leading to a response rate of 42.7%. Because the surveys were completed via face-to-face data collection methods during a two-day event, addressing nonrespondents was not possible. Therefore, we caution against generalizing these findings beyond this group of respondents.

This study utilized a researcher-developed instrument that first introduced an illustration of the three-component model. Respondents were then asked to draw the model of their current agricultural education program, indicating the emphasis on each area through the size of the circles. Specification regarding the size of the circles was given for clarity; larger circles were to indicate greater emphasis while smaller circles were to

indicate less emphasis. Respondents were told their models should include the three components of the traditional model, but could include additional components as the teacher saw fit. After these circles were drawn, teachers were asked to incorporate a circle of appropriate size to represent the emphasis they put on their personal lives. Each of these questions was repeated, asking teachers to illustrate the components of their ideal agricultural education program. For the ideal program illustration, the model could include or omit any circles to best represent the teacher's ideal. The survey included a demographic section that asked teachers about their age and amount of time teaching agricultural education. The instrument's face and content validity was confirmed by a panel of three experts in agricultural education. Reliability in the form of stability over time was established via a pilot test using University of Arkansas graduate students who had previously gone through the student teaching experience and faculty members who had previous careers as agriculture teachers ($n = 6$). Pilot test respondents were asked to respond to the items based on their experiences with their most recent high school teaching experience, and were asked to complete the survey two times, two weeks apart. Test-retest reliability was calculated using Pearson's correlation (Huck, 2008) and was found to be .88.

Data were analyzed using descriptive statistics. Teachers' emphasis on each program component was calculated using their illustrations. First, each circle's diameter was measured. Because teachers were freehand drawing the circles, lack of symmetry was overcome by first measuring the diameter at the each circle's widest point, then measuring the diameter of the circle at the point 90 degrees perpendicular to the widest point. These two diameters were averaged to determine each circle's diameter, which was then used to calculate the circles' areas. Total program area was calculated by adding the areas of the instruction, FFA, and SAE circles together, which was then used to determine the program's percent emphasis on each component. While teachers were instructed to include any additional components they saw fit, no additional circles were drawn. The total program area was added to the personal life circle's area to calculate total program and personal life, which was then used to determine the percentage of total life the teacher spent on his or her personal life and career responsibilities. Mean percentages of emphasis and standard deviations were calculated. Additionally, teachers' emphasis on each component was utilized to depict program types. Programs were organized by their level of emphasis; those with one component making up over 50% of the program and the two remaining components being above 20% and within 10% of one another were labeled as "heavy" in the larger area. Programs with one area comprising under 20% and the remaining areas being within 10% of one another were labeled as "light" in the smaller area. Those with two areas under 20% were labeled as "dominating" in the largest area, while those with three areas each ranging between 20% and 40% were labeled as "model" programs. Programs were able to be labeled as both "heavy" in one component and "light" in another if they had one area over 50% and another less than 20%. Figure 2 displays an example of SAE Light and Instruction Dominating programs.

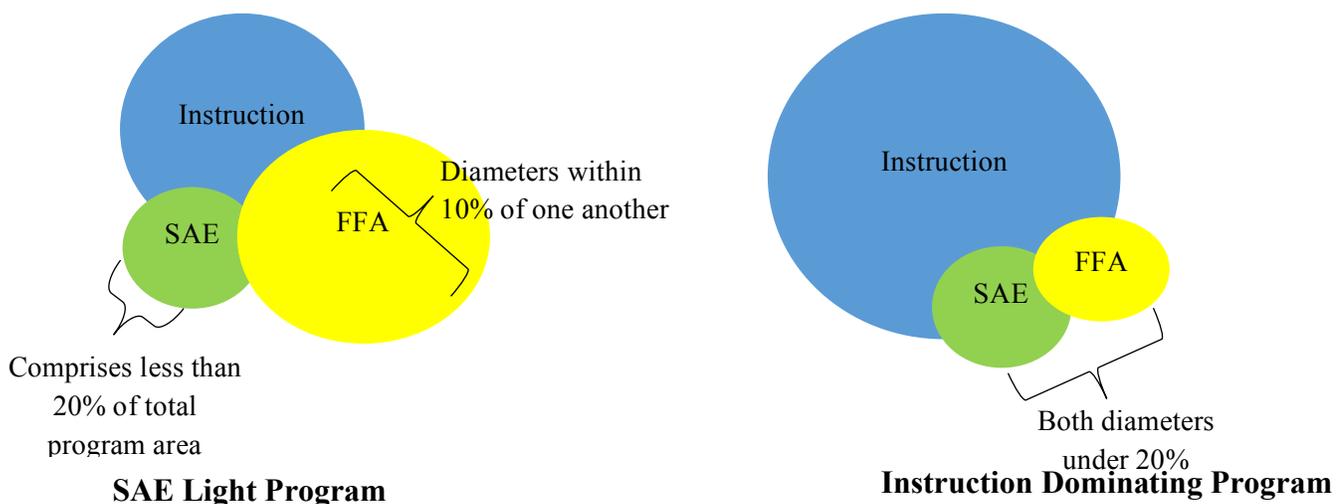


Figure 2. Pictorial Display of Program Emphasis Designations

Findings

Teachers' Current Emphasis on Instruction, SAE, FFA, and Personal Lives

On average, classroom and laboratory instruction made up 49.0% of respondents' programs ($SD = 20\%$), while FFA made up 36.4% ($SD = 17\%$) and SAE made up 13.9% of respondents' programs ($SD = 10\%$). The most common program types were SAE Light and Instruction Heavy/SAE Light ($n = 8$) (Figure 3). Six teachers reported leading model programs. Light emphasis on SAE was most common, being a characteristic of 56% of the programs ($n = 18$).

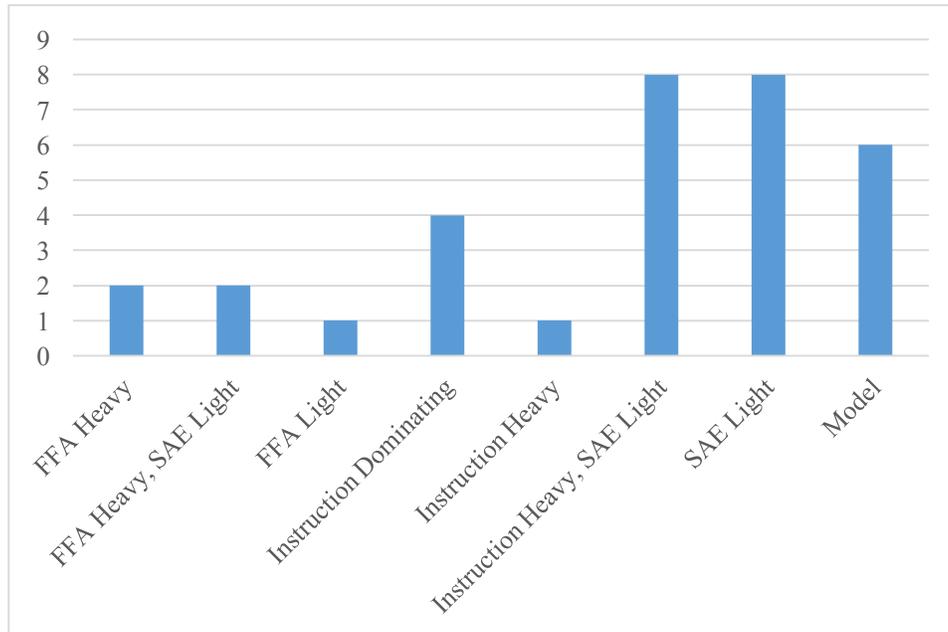


Figure 3. Current Program Types Reported by Respondents

Respondents reported devoting 18.6% of their time to their personal lives ($SD = 19\%$), leaving the remaining 81.4% of their efforts devoted to their agriculture programs. Emphasis on one's personal life ranged from 1.6% to 82.3%.

Teachers' Preferred Level of Emphasis on Instruction, FFA, SAE, and Personal Lives

Ideal program averages fell within the range of the model program; respondents indicated that the ideal program would consist of 40.6% classroom and laboratory instruction ($SD = 14\%$), 35.8% FFA ($SD = 10\%$), and 23.6% SAE ($SD = 13\%$). With regard to total program makeup, a model program was desired by the most respondents ($n = 16$; 50.0%). A program with limited emphasis on SAE was desired by 37.5% of respondents ($n = 12$) (Figure 4). Over half (65.6%, $n = 21$) of respondents indicated a difference between the type of program they currently lead and the type of program they perceived as ideal.

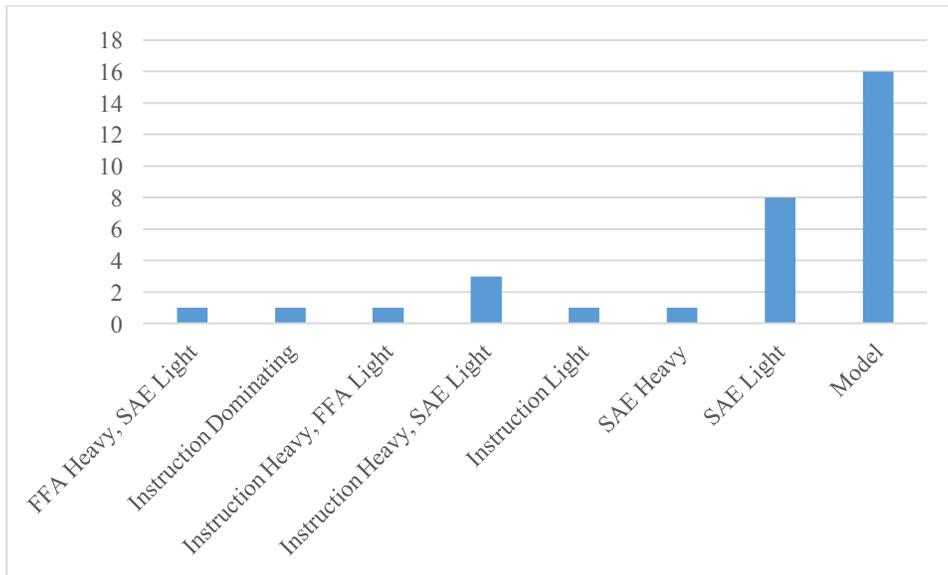


Figure 4. Ideal Program Types Reported by Respondents

Respondents reported an ideal program would allow for 27.2% of one's time to be devoted to one's personal life ($SD = 23\%$), with the remaining 72.8% of efforts being devoted to the agriculture program. Perceived ideal emphasis on one's personal life ranged from 1.4% to 99.0%.

Differences in Agricultural Education Programs between Teachers within and outside the Millennial Generation

Teachers outside of the millennial generation, on average, emphasized classroom and laboratory instruction the most (52.1%, $SD = 24\%$), then FFA (33.4%, $SD = 17\%$), and SAE the least (14.4%, $SD = 10\%$) (Figure 5). They devoted an average of 21.2% of their time ($SD = 20\%$) on their personal lives, leaving the remaining 78.8% for program-related efforts. Teachers of the millennial generation, like their older peers, emphasized classroom and laboratory instruction the most (46.7%, $SD = 15\%$), then FFA (38.7%, $SD = 16\%$), and SAE least (13.4%, $SD = 9\%$) As Figure 4 displays, they focused more of their time on FFA activities and less of their time on classroom and laboratory instruction than their older peers. Millennial respondents, on average, devoted less time than their older peers (17.0%, $SD = 18\%$) to personal activities, focusing instead on program-related efforts 83% of the time.

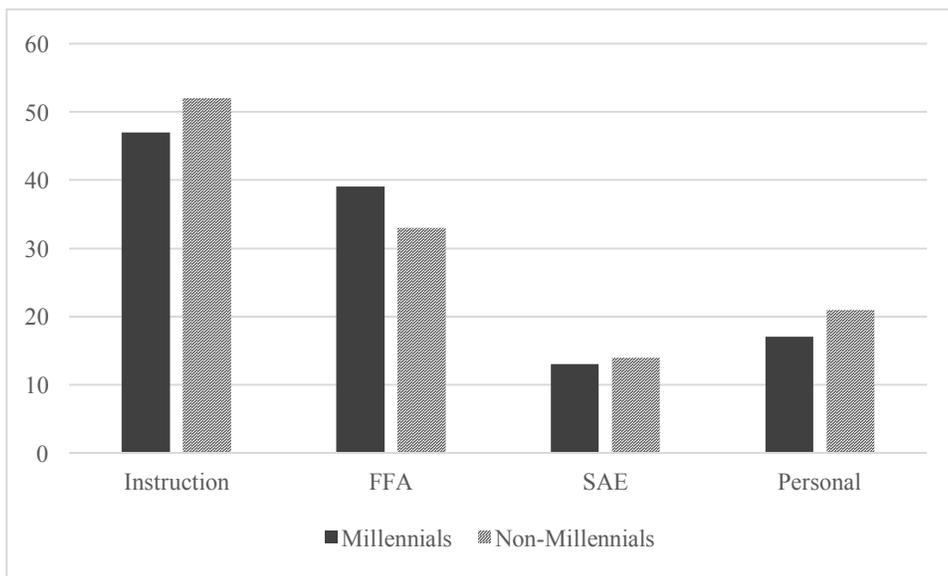


Figure 5. Percent of Millennials' and Non-millennials' Time Devoted to Program Components and Personal Life

With regard to program type, few differences were found between Millennials and Non-millennials (Figure 6). Teachers in the millennial generation lead programs that were heavy in instruction and light in SAE more frequently than their older peers.

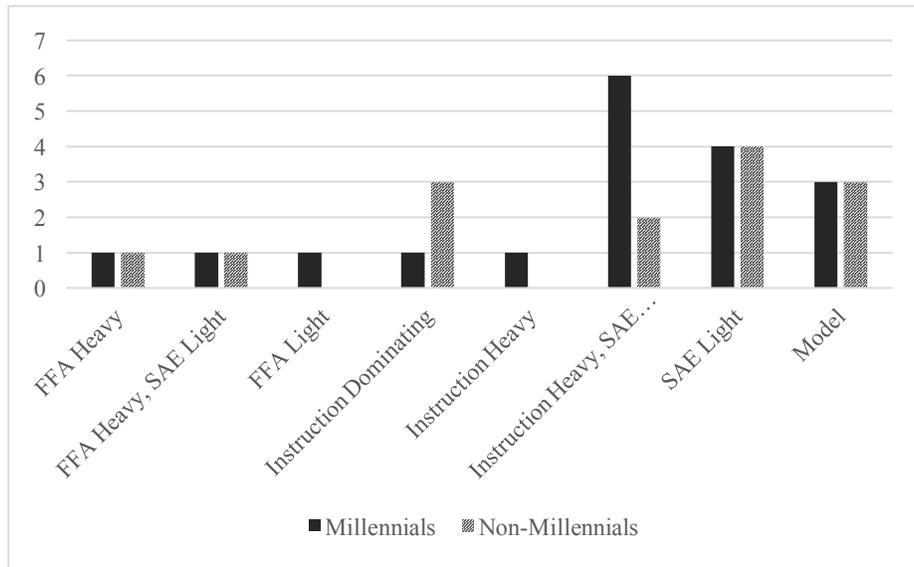


Figure 6. Current Program Types of Millennial and Non-millennial Respondents

Differences in Ideal Agricultural Education Programs of Teachers within and outside of the Millennial Generation

While teachers outside of the millennial generation wished to have more personal time than those within the millennial generation, disaggregating by generation did not divulge any differences in emphasis on any program component between the two groups (Figure 7).

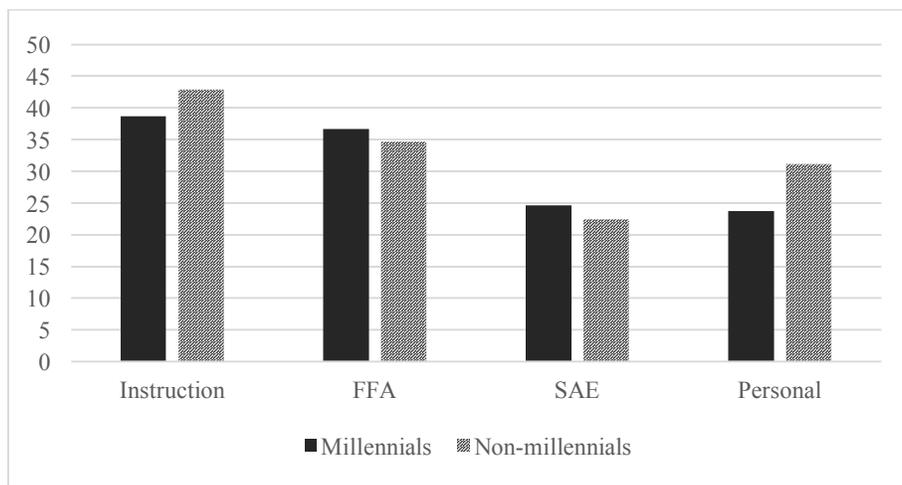


Figure 7. Millennials' and Non-millennials' Ideal Percent of Time Devoted to Program Components and Personal Life

Both groups of teachers held similar interests in leading either model or SAE Light programs (Figure 8). Seventy-one percent of Non-millennial respondents desired to lead a program different in structure to the one they currently lead, while 61.1% of millennial respondents had similar desires.

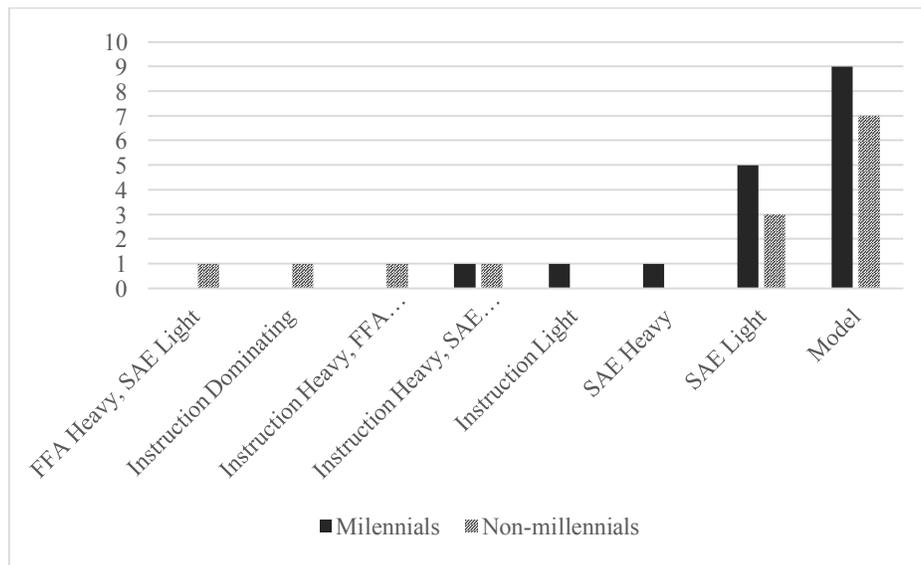


Figure 8. Millennials' and Non-millennials Ideal Program Types

Conclusions, Implications & Recommendations

The average program structure reported by respondents, regardless of generation, adhered to the SAE Light model, with classroom and laboratory instruction being emphasized to the greatest degree and SAE being emphasized least. Lesser emphasis on SAE was a characteristic of over half of respondents' programs. Experts in agricultural education have been focusing on improvement of the SAE component for several decades, recognizing its ability to be carried out as the model intends as a persisting challenge across the nation (Croom, 2008; Dyer & Osborne, 1995; Dyer & Williams, 1997; Rubenstein & Thoron, 2014).

Findings indicated a majority of respondents did not lead a program aligning with their ideal program, reducing the likelihood that teachers lead SAE Light programs due to a lack of perceived value in SAE. Other studies have reported the value teachers hold in SAE programs (Lewis, et al., 2012), further supporting the notion that teachers want to emphasize SAEs, but have not been successful in doing so. This disparity between current and ideal program was found both within and outside of the millennial generation. Research should be conducted to determine whether this lack of alignment between current program and ideal program structure influences teachers' levels of job satisfaction, as satisfaction plays a role in teacher retention (Torres, et al., 2008).

The majority of respondents identified the standard three-component model, with near equal emphasis on each component, as the ideal program type, suggesting their knowledge of the three components of school-based agricultural education was acquired via a learning experience that espoused this model as the standard. This implication is supported through the prevalence of the standard three-component model in introductory agricultural education texts (Phipps, et al., 2008, Talbert, et al., 2007) and undergraduate courses. These findings suggest that there may be a conflict between the traditional standards displayed in the three-component model and teachers' abilities to implement those standards. Phipps, et al. (2008) stated emphasis within each component shifts over time; however, the model's illustration of three circles of equal size may lead instructors and students to perceive a program with equal emphasis on all three components as ideal. We recommend further research, likely using qualitative methods, be conducted to better understand the reasons that cause teachers to lead programs that emphasize the three components of agricultural education to different levels than they would find ideal, as well as why they perceive a model with equal emphasis on each component as ideal. Additionally, should replication of this study find these results to be similar to other populations of agriculture teachers, teacher educators should reevaluate the utility of the traditional three-component model to discern whether the model's three identical circles accurately portray the profession's intended program standard.

Teachers outside of the millennial generation put less emphasis on FFA than those within the millennial generation. This finding could imply that more experienced teachers need less preparation time for FFA than their less experienced peers; alternately, they could value FFA to a lesser degree and instruction to a greater degree than younger teachers. While FFA involvement has been associated with various student benefits (Ahrens, et al., 2015; Rose, 2014; Wingenbach & Kahler, 1997), the prominence of classroom and laboratory instruction as the foundation of the agricultural education program (Talbert, et al., 2007) suggests all teachers should emphasize classroom and laboratory instruction at least as much as the other two components. We recommend future research focus on the value different generations of teachers place on each component of the agricultural education model. As the millennial generation begins to hold the majority of teaching positions in the upcoming years, an examination of how their values regarding instruction, FFA, and SAE compare to that of their predecessors will assist the profession in guiding the vision and strategic plan for agricultural education.

Teachers indicated a desire to spend more time on their personal lives than they do currently. We could argue that human nature leads individuals to note a preference for any aspect that enhances one's life; numerous studies have found agriculture teachers to indicate a need for more funding, support, and facilities, regardless of their current access to these items (Myers, Dyer, & Washburn, 2005). However, these findings could suggest a need for the profession to explore avenues to reduce teachers' work responsibilities, as recruitment of agriculture teachers has been an area of focus within the profession (Walker, et al., 2004). Identification of the career aspects undergraduates find unappealing and working to increase the attractiveness of the career field may assist in teacher recruitment, especially among Millennials (Center for Women and Business, 2013).

Millennial generation teachers desired to have more personal time than they do currently, but to a less degree than their older peers. These findings contradict the notion that employees of the millennial generation are less focused on work ethic and more interested in work flexibility than employees of the previous generations (Center for Women and Business, 2013). Most beginning teachers enter the profession with little personal responsibility compared to their older peers; as they age, growing personal responsibilities such as raising a family and caring for aging parents may increase a teacher's desire for more personal time. Further research could explore the differences between each generation's use of and desire for personal time.

We recognize these findings and conclusions are subject to the limitation in teachers' different interpretations of each element of the three-component model. As displayed by Croom (2008), the model's three components overlap one another, suggesting many activities within the realm of the agriculture teacher's job description could be considered to be part of more than one component. Different interpretations of job responsibilities could have led teachers to consider them to be part of different components of the model, impacting their level of emphasis of each component. However, because teachers used their own interpretations of the components to indicate their current program structure and ideal program structure, the disparity between the two cannot be explained by differences in interpretations of components. While this study's instrument didn't require teachers to differentiate between each component's responsibilities, research should be conducted to determine how teachers categorize different responsibilities in relation to the three-component model.

This study served as a starting point to describe teachers' current and ideal programs with regard to emphasis on the three components of the standard agricultural education program. The instrument developed for this study enabled respondents to fully illustrate the differences in their level of emphasis on their program components without requiring mathematical estimations and time allocations, thereby reducing inaccuracies in data due to the effort required to respond in an appropriate and complete manner (Dillman, Smyth, & Christian, 2009). We recommend the instrument be utilized in the future with different sampling frames to further establish and document its utility. However, the current illustrative requirements of the survey limit data collection to paper-based administration; we recommend researchers attempt mail or face-to-face methods of survey administration. Feasibility tests using electronic illustration tools such as Microsoft Word's shape illustrator are also recommended in an effort to expand the survey's use to online and electronic methods of data collection, which can open access to more representative sampling frames. Replication of and expansion upon this study

will assist the profession in educating preservice teachers in the art of aligning their current programs with their profession-supported ideals, thereby increasing job satisfaction and reducing the agriculture teacher shortage.

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Variability versus Continuity: Student Teachers' Perceptions of Two University Supervision Formats

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Abstract

As a formidable component of the preservice teacher education program, the aspects that make up the student teaching experience, from site placement to feedback received from site and university supervisors, are each influential on the quality of the student teaching experience. Whether made consciously or unconsciously, university supervisors must decide whether to allocate observations by student, wherein each supervisor meets with a small set of student teachers multiple times, or by visit, wherein each supervisor meets with every student teacher one time. This qualitative study explored student teachers' perceptions after being observed using one of the two aforementioned formats. Student teachers valued time with their university supervisors, reporting a desire for more time under observation and for discussion and feedback. They also appreciated the variability in feedback supplied by multiple supervisors, but desired continuity in feedback found with a single supervisor. Recommendations, including several potential observation formats, are offered to assist university supervisors in maximizing their time with student teachers while meeting the student teachers' conflicting needs of both variability and continuity in feedback.

Introduction/Conceptual Framework

The student teaching experience has been acknowledged by some as the most important part of a preservice teacher's training experience (Deeds, Flowers, & Arrington, 1991; Edwards & Briers, 2001; Harlin, Edwards, & Briers, 2002; Levine, 2006). Serving as the culminating field-test for individuals on the cusp of receiving teacher certification, student teachers "must synthesize everything they have learned about planning instruction: collecting and developing instructional materials, teaching lessons, guiding small group activities, and establishing and maintaining order" (Greenberg, Pomerance, & Walsh, 2011, p. 1). As a formidable component of the preservice teacher education program, the aspects that make up the student teaching experience, from site placement to feedback received from site and university supervisors, are each influential on the quality of the student teaching experience.

The National Council on Teacher Quality, National Council for Accreditation of Teacher Educators, and Association of Teacher Educators each maintain standards for establishing a quality student teaching program. These standards focus on the following areas: length of placement; role of the teacher preparation program in selection of the cooperating teacher; qualifications of the cooperating teacher; qualifications of teacher candidates for student teaching; expectations for the student teaching experience; schedule for observations by the university and school supervisors; culminating projects; alignment of student teaching with the school calendar; activities during student teaching placement; selection of university supervisors; evaluation for continuous improvement of cooperating teacher selection process and school selection process; and selection of placements (Greenberg, et al., 2011). Several of these standards focus on the university supervisor, who "holds a vital role in the student internship process, providing not only observational feedback, but significant contributions to the student internship process" (Rubenstein & Thoron, 2013, p. 135).

Historically, university supervisors carried out their observations in a manner that focused on inspection of the teaching practice rather than on helping teachers improve their practice (Bolin & Panaritis, 1992). Student teacher supervision evolved over time to include a focus on teacher reflection and growth (Sullivan & Glanz,

2000). Rubenstein and Thoron (2013) distinguished these two coexisting roles as that of supervisor, promoting teacher improvement through guidance and reflection, and that of evaluator, providing judgement regarding the teacher's performance. The supervision process can vary; number of observations, presence and agenda of pre- and post-observation meetings, length of observation, and nature and format of feedback given can all vary from supervisor to supervisor. Fritz and Miller (2004) found 167 teacher educators from 67 institutions were responsible for student teacher observations within the agricultural education discipline, suggesting that these supervisor-dependent factors can vary greatly within a university, as multiple supervisors are responsible for observing a student teaching cohort. Noting that faculty members at the University of Florida serving as university supervisors refrained from discussing observation techniques, Rubenstein and Thoron (2013) recommended that "university supervisors utilize similar supervision strategies when supervising preservice teachers during their student teaching internship" (p. 145).

Recommendations and practices regarding the frequency with which a single student teacher is observed varies by organization. The National Council on Teacher Quality (Greenburg, et al., 2011) recommended a minimum of five observations at regular intervals throughout a semester-long student teaching experience. Fritz and Miller (2004) found supervisors within agricultural education made an average of three visits to each student teacher. Greenberg, et al. (2011) reported the range of visits to be between two and five per student teacher. Regardless of the number of visits, the practice of visiting student teachers multiple times during a semester and the presence of multiple university supervisors at one institution leads to a choice between two types of student teaching observation formats. Whether made consciously or subconsciously, university supervisors must decide whether to allocate observations by student (single-observer formats), wherein each supervisor meets with a small set of student teachers multiple times, or by visit, wherein each supervisor meets with all student teachers one time (multi-observer formats) (Figure 1).

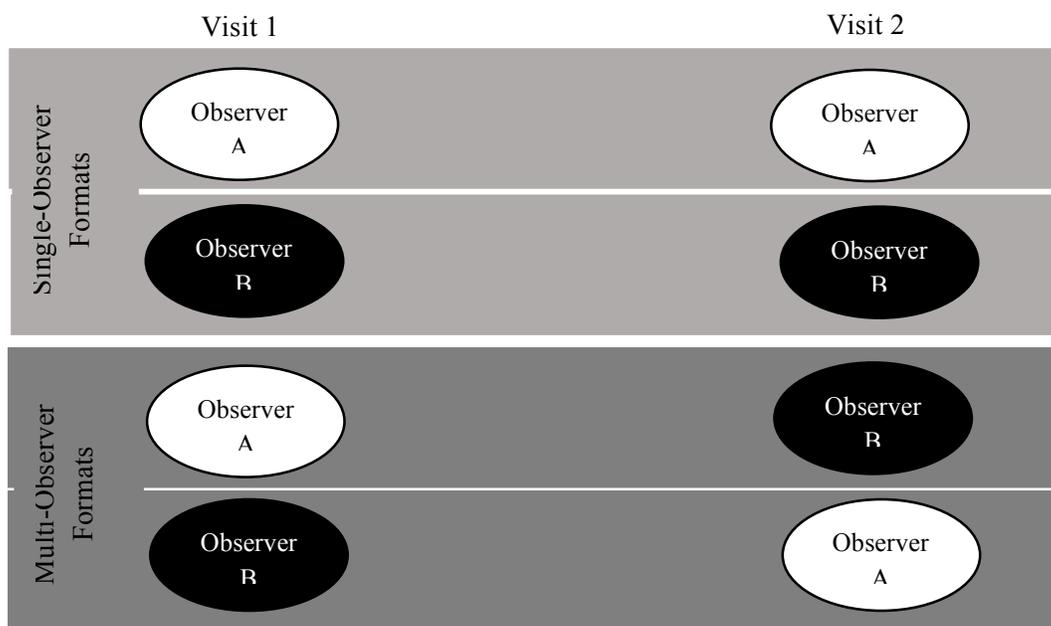


Figure 1. Formats for allocating student teacher observations among multiple university supervisors.

The great impact university supervisors' feedback has on the student teaching experience suggests this choice should be a deliberate one, supported by data. A review of the present literature yielded few studies focusing on the university supervisor component of the student teaching experience (Fritz & Miller, 2004; Rubenstein & Thoron, 2013). While Rubenstein and Thoron (2013) studied the actions of supervising teachers at one

university using consistent supervisors over time, Fritz and Miller (2004) did not assess the division of university supervisor responsibilities. Therefore, there exists a need to better understand how the division of observation responsibilities between multiple university supervisors shapes the student teaching experience.

Purpose/Research Questions

The purpose of this qualitative study was to explore student teachers' perceptions of their internship experience after experiencing two observations from university supervisors in one of two formats; *single-observer* students received two visits from one university supervisor while *multi-observer* students received one visit each from two university supervisors. In order to meet this purpose, the following research questions guided the study:

How do student teachers describe the feedback received by their university supervisors?

What aspects of the university supervisor visits do student teachers value, and how are continuity and variability within observer feedback perceived?

How can university supervisors adjust their visits to be most effective for these students?

Theoretical Perspective

While qualitative studies do not rely on theory to confirm or conflict findings, Flick (2006) recommended qualitative researchers utilize theories to conceptualize and guide the focus of the study. This study's design and focus were developed based on the tenets of constructivism and control theory (Carver & Scheier, 1982). Knowledge constructions can present different meanings to different individuals based on the constructivist premise that people interpret experiences differently, regardless of the experience's reality or true meaning (Beard & Wilson, 2006; Doolittle & Camp, 1999). Therefore, the separate individual experiences of faculty members lead to different interpretations of an observation (Young & Henquinet, 2000). Subsequently, feedback given based on the interpretation of the observation differs as well. According to control theory, the feedback, molded by the supervising teacher's previous experiences, impacts the subsequent learning experience and behaviors of the student teacher. Control theory states that individuals attempt to reduce the gap between a standard and a behavior based on the feedback received. This process is termed the *negative feedback loop*, as its function is to reduce the perceived deviations between a behavior and a standard. Carver and Scheier (1982) posited the feedback system is not to create behavior, but rather to "create and maintain the perception of a specific desired condition: that is, whatever condition constitutes its reference value or standard of comparison" (p. 113). The discrepancy can be eliminated via one of several actions: changing behavior to change future feedback, changing the standard to align with present feedback, rejecting the feedback, or escaping the situation that points to discrepancy (Kluger & DeNisi, 1996). Student teachers, therefore, will alter their instructional practices to elicit more favorable feedback from their university supervisor, reject the feedback by ignoring the university supervisor, or escape the situation by removing themselves from the student teaching experiences which yield negative feedback (for example, avoiding lectures or group work). Constructivism and control theory guided the study's conceptualization and context (Flick, 2006).

Researcher Subjectivity

The findings extracted and conclusions made from qualitative inquiry are done so from the lens of the researchers; "the subjectivity of the researcher... becomes part of the research process" (Flick, 2006, p. 16). A subjectivity statement made by the researchers assists the reader in understanding the perspective through which the research was conducted (Preissle, 2008). The three researchers conducting this study were all certified in agricultural education and had completed internships as student teachers. Two of the researchers were agriculture teacher educators at the university level while one was a graduate assistant in agricultural education.

The teacher educators had each served as university supervisors for student teachers and had previously been employed as high school agriculture teachers. One of the teacher educators had served as a site supervisor for three student teachers while teaching high school. Two of the researchers served as the university supervisors in this study. The third conducted the focus groups, but had no contact with the student teachers in a supervisory or observational capacity.

Methods

Description of Participants

This study utilized eight 2015 preservice teachers at the University of Arkansas during their spring internship experience. Students were randomly assigned to two groups, each using a different university supervision format. Four students were assigned to the *single-observer* group, while four were assigned to the *multi-observer* group. The *single-observer* group consisted of one male and three females while the *multi-observer* group consisted of two males and two females. Focus groups were conducted separately by group. All students were required to complete their internship, including the university supervisor visits, as a component of their degree requirements. However, participation in the study was voluntary; students had the option to refrain from participating in the focus groups. Two students declined participation, leading each focus group to contain three participants.

During the student teaching internship, extenuating circumstances altered the experiences of two of the student teachers. One student teacher was involuntarily transferred to a different school to complete h[is/er] internship approximately one month into the semester due to a complication that arose during h[is/er] background check. Another student missed approximately two weeks of the internship due to a family emergency, and resumed h[is/er] internship with one week left in the semester. Both of these students were in the *multi-observer* group.

Description of University Supervision

Two university supervisors were responsible for all visits to student teachers. Student teachers were each observed two times during the spring semester. Each was responsible for observing two student teachers in the *single-observer* group twice during the semester, as well as for visiting each of the four student teachers in the *multi-observer* group one time. Two of the student teachers in the *multi-observer* group were observed by one supervisor first, while the other two were observed by the other supervisor first. During visits, the supervisors observed the student teacher teaching during a class, spoke with the agriculture teacher under whose supervision the student teacher was working, and provided feedback to the student teacher. A uniform student teaching observation form was also completed during each visit. The duration of each visit varied based on the schedules of the university supervisor and student teacher.

Data Collection

At the completion of the student teaching internship, student teachers participated in one of two focus group interviews based on the observation format to which they were assigned. Focus group interviews were selected as an effective method of data collection due to their ability to provide quality control; “participants tend to provide checks and balances on each other which weeds out false or extreme views. The extent to which there is a relatively consistent, shared view can quickly be assessed” (Patton, 2002, p. 386). Each focus group interview was moderated by one of the researchers not involved in student teaching supervision. Separate but similar focus group interview protocols were used to gather data pertaining to the research questions. Protocols differed where appropriate to align questions to the format of the observations. For example, the *single-observer* group’s protocol asked, “Did you experience improvement in your performance between your university supervisor’s

first and second visit?” while the *multi-observer* group’s protocol asked, “Did you experience improvement in your performance between visits made by each of the university supervisors?”. The focus group interviews lasted between 40 and 50 minutes. Discussion was audio-recorded and later transcribed verbatim for accuracy. Participants were given coded identifiers to maintain confidentiality. Coded data was first identified by the group (SO for *single-observer* group and MO for *multi-observer* group), participant (P1-3), and line number (L). All data collection procedures were approved by the University of Arkansas Institutional Review Board.

Data Analysis

Focus group interview transcriptions were analyzed using the constant comparative method (Lincoln & Guba, 1985). This method includes four stages: compare incidents in the data applicable to each category, integrate categories, delimit the construction, and write the construction. We coded transcriptions for themes, which were then evaluated to unearth categories within the data. We then compared incidents both within a focus group interview and between focus group interviews. Initially, an open coding procedure was used to unearth themes found within fragments of the data and then compare those themes to the interview transcriptions to determine whether other fragments aligned as well. Fragments were then compared to evaluate whether information was repeated or new information was offered. Repeating information was placed into the existing theme while new information was initially placed into a new category. Once themes were established, categories were labeled to reflect the data, adjusting the placement of fragments into different categories or collapsing and expanding categories as appropriate. A final evaluation determined that all themes were labeled in a manner accurately representing the data and all themes were found unique to one another.

Evaluative Criteria

Procedures sought to establish credibility, transferability, dependability, and confirmability throughout the development of this study in order to confirm its trustworthiness (Lincoln & Guba, 1985). Credibility, defined as the reader’s confidence in the researchers’ abilities, the design of the study, and the findings to represent the data (Ary, Jacobs, Sorenson, 2010) was established through the use of triangulation between the three researchers. All researchers evaluated the data for themes and confirmed the presence of themes listed in the findings. Transferability was established through the use of a description of the context, including the university supervision format and university supervisors (Holloway, 1997). Dependability and confirmability were addressed via an audit trail, consisting of audio-recorded and transcribed data, triangulation in data analysis between researchers, focus group interview protocols, and acknowledgment of the researchers’ subjectivity.

Findings

Three themes were uncovered from within the data: feedback from the university supervisor is valued; time considerations impact the effectiveness of the visit, and the value of variability between university supervisors is dependent upon communication between supervisors.

Feedback from the University Supervisor is Valued

Regardless of the format of supervision, participants in both groups valued the feedback from their university supervisors. Those that were observed by both supervisors noted they “definitely liked having feedback from both of them” (MOP1L140). Participants noted the boost in confidence received from positive feedback, stating, “. . .just hearing you did good, or good job as [the university supervisor] left was reassuring that I was on the right track...it was well worth...my time” (MOP1L21-22, 29). They also valued the perspective given by the university supervisor: “[The university supervisor] noticed things that I never noticed...you know, [s]he came and said that and it helped” (MOP3L23-26). Interns reported that the feedback from the university supervisor

initiated internal reflection: “I felt it helped redirect you if you were kind of off the beaten path. You can reevaluate yourself” (MOP1L27-28) and made them “more motivated to get better scores for the next time [the university supervisor] came and visited” (SOP2L9-10). One student reported a negative experience with h[is/er] supervising teacher and stated [s]he did not value the feedback given:

When [Supervisor A] came by and observed it was more constructive. It was a class I normally teach and so it was more of an average performance of what I was doing. When [Supervisor B] came by, I had been gone for a week, came back to a class I never taught in the first place, and somehow that was a representation of my teaching...I used [Supervisor A’s] feedback and [Supervisor B], I kind of ignored. (MOP2L40-43)

However, [s]he stated that [s]he expected in the typical student teaching experience, feedback from any university supervisor would be valuable, and that h[is/er] experience was atypical due to personal circumstances. When asked whether [s]he would have preferred having either Supervisor A or Supervisor B observe h[im/er] multiple times, [s]he stated, “In either case, I would have preferred it” (MOP2L111).

Time Considerations Impact the Effectiveness of the Visit

Participants in both focus group interviews reported that time, in one of three fashions, impacted the effectiveness of their visits from university supervisors. Participants felt that more time was needed during the visit from their supervisor for a holistic teaching experience to be observed and when providing feedback for adequate understanding to be reached, and that the timing of visits in relation to one another and the student teaching schedule played an impactful role in the visits’ effectiveness.

Participants from both focus group interviews stated their visits from university supervisors were less effective than they could have been because of the timing of their two visits. One participant said:

I wish that I could have had more time between my visits so that I could have maybe got some guidelines or evaluation at the beginning, not so much like three weeks apart, cause at three weeks apart toward the end, I’ve already found my go...of how I’m going to do it. So I wish it was at the beginning and one closer at the end. (SOP2L11-14)

Another noted the external constraints that impacted the short duration between h[is/er] two observations, and suggested this time limitation was a factor contributing to h[is/er] lack of improvement:

I didn’t see improvement because between the two times that the professor visited we were going to contests and so by the time the professor came back, it was only a couple of weeks. There wasn’t much teaching time to improve. (MOP3L39-41)

This notion of inability to adapt lessons was expressed by several students, who noted they “didn’t have time to adjust” (MOP1L108) when observed twice within two weeks and “there wasn’t really any time to implement much of a change” (MOP2L58) when observed in the last weeks of the semester.

Participants also desired more time under observation in order to provide the university supervisor with a comprehensive portrayal of their teaching abilities. Several participants stated they wished the university supervisor would spend the entire day with them, as their teaching styles changed based on the class. One participant stated [s]he regretted missing out on h[is/er] university supervisor’s suggestions for improvement of h[is/er] more challenging classes: “[Supervisor A] came the same time both times and saw my good class. I kind of wish I would have had more guidance on my bad classes so I could know what to do differently. But they were never seen, so...” (SOP2L29-30). Several noted dissatisfaction when their observations were shorter than anticipated:

On both observations, like the first one, [Supervisor A] came by and [s]he sat through most of my class and went out to talk to the cooperating teacher and then sat through like half of P1's class. And then left because [s]he had a meeting to go to. In the exact same fashion, [Supervisor B] sat through [P1's] entire class and then 45 minutes of my class, which is maybe half of it before [s]he left. So I feel like on both of them they didn't get a full opinion of either of us really. (MOP2L92-96)

On one of my visits, [Supervisor B] was a little late to the class so [s]he missed part of the lesson because I would teach a lesson in the beginning and [s]he missed all of the short lesson and got there just for the project so I got some points taken away because [s]he didn't see that part of my lesson. The lecture part. (SOP1L50-52)

Finally, students desired more time to discuss their observations with the supervising teacher. One student described h[is/er] hurried feedback as "kind of vague" (MOP1L20), noting the supervising teacher "had to be somewhere. [S]He sat through most of the lesson so [s]he kinda had to leave early I guess. So as far as sitting down and talking with [Supervisor A], it didn't really happen" (MOP1L65-66). They expressed a desire to see more written feedback, as well as having more dedicated discussion time after the observation. One student valued the feedback so highly, [s]he was willing to drive to the supervisor's office for additional time: "I wouldn't even mind that. If they have to leave the observation, just coming in and talking to them about what they observed" (MOP2L147-148). Another student stated the little time for feedback left h[im/er] wondering about h[is/er] improvement from the first visit: "I was told I did a good job on the second visit, but I wasn't sure how I did on those areas of improvement" (SOP1L32-33).

Value of Variability between University Supervisors is Dependent upon Communication between Supervisors

Student teachers acknowledged that feedback provided varied by university supervisor. One student noted the two supervising teachers focused on different items during their visit, but both provided sound advice. Students in the *multi-observer* group perceived the variability negatively, stating they would have preferred to have one observer: "One [university supervisor] might be looking at one aspect and then the other teacher is looking at the other so you don't get the full... so I think it would have been better for a single teacher to observe the same student teacher" (MOP3L119-121). Another stated "having two instructors, it kinda makes it uneven perspectives" (MOP1L117-118). Students in the *multi-observer* group posited one component that would shift the variability's detriments toward being more beneficial: "unless they're communicating constantly, they're never going to have a complete picture of where you need to be headed" (MOP2L113-114). Another added, "I don't know if they really communicated much. You know, [Supervisor A] wasn't like, 'did you work on this?'" (MOP3L76-77).

Students in the *single-observer* group echoed similar feelings, but from a different perspective. As a group, they preferred to have multiple observers. One stated the sentiments of the group: "The professor who visited me, [s]he has, like, h[is/er] persona of it and this is what [s]he would do and change, but someone else might have seen something else to add to that" (SPP3L21-22). They acknowledged that receiving feedback from two university supervisors with varied perspectives would make them "more well-rounded teachers" (SOP1L61-62). One student teacher recognized the variability from university supervisors' feedback was not just from a teaching standpoint, but also within their areas of expertise: "I liked that my professor came and observed my Equine class, but I would have liked another professor to observe my shop class because that was more their specialty" (SOP1L23-24). While they viewed the option of varied supervisors differently than their *multi-observer* group counterparts, their opinions regarding necessary measures to make the variability effective were similar: communication between university supervisors is crucial.

I feel like they could have combined at the end and been like, “this is what I saw.” “This is what I saw.” They could have discussed together with us after they came back, this is what they thought and it would have been more of like a team feeling. (SOP3L63-64).

Conclusions

Control theory states that adjusting behavior to impact future feedback, changing the standard to align with present feedback, rejecting the feedback, or escaping the situation (Kluger & DeNisi, 2007) are all potential options when given feedback. Most student teachers elected to attempt behavioral change in an effort to alter future feedback. When that feedback was given by the same university supervisor during their second visit to the student teachers in the *single-observer* group, the student teachers were satisfied with their progress related to that behavior. However, they acknowledged the value of differing perspectives that result from individual background experiences, which is the foundation of constructivism (Beard & Wilson, 2006). Student teachers in the *single-observer* group desired visits by multiple university supervisors in order to experience variability in the focus of their visits, provided those supervisors discussed the student teacher’s performance in order to provide a degree of continuity during feedback. Participants in the *multi-observer* group felt their experiences resulted in inconsistent feedback that made it difficult for them to evaluate their performance over time. When that feedback was not given during the subsequent visit by the second supervisor, students experienced frustration. They, too, noted that feedback from both university supervisors was valuable, but stated the value could only be realized when the university supervisors communicated regularly to provide feedback on similar aspects of their performance. While the two groups approached the question of using one or two university supervisors from different angles, they arrived at the same conclusion: multiple perspectives is crucial to enhancing one’s teaching practices, but the *negative feedback loop* (Carver & Scheier, 1982) must be closed; follow-up feedback after a change in behavior must be offered in order for the student teacher to perceive a reduction in disparity between the standard and his or her behavior.

The students also valued their time with their university supervisors. They felt more observations, more time spent being observed, and more time for feedback would enhance the student teaching experience. When the students perceived a great disparity between their performance and the standard, several of them rejected the feedback provided by their university supervisors on the grounds that time given prevented them from receiving more favorable feedback. Student teachers stated that limited time under observation prevented the university supervisor from observing a comprehensive display of their teaching practices. It was espoused that the short time frame between two visits prevented them from being able to adapt their teaching practices. Conversely, a long time frame from when they first started teaching until when they were first observed led them to adopt subpar teaching practices, and the short amount of time dedicated to receiving feedback prevented them from fully comprehending changes needed to be implemented. They acknowledged that scheduling conflicts and alternative responsibilities may reduce the control the university supervisor has on time allowed for student teaching observation, but stated that efforts made to devote more time to observations would be beneficial.

Discussion & Recommendations

Qualitative research is not intended to be generalized beyond the study, as the context cannot be repeated outside of the research conducted. Rather, the discussion and recommendations are offered as potential answers for similar questions, as well as for guidance in future research. Many institutions offering degrees in agriculture teacher education have similar contexts, wherein multiple university supervisors are responsible for observing a group of student teachers multiple times throughout a semester. Regarding recommendations for practice, we acknowledge students’ need for a structured observation schedule that designates specific time between visits, as well as ample time for observation and discussion. We recommend each visit be conducted

over an entire school day to reduce conflicting appointments, ensure a comprehensive observation that displays a holistic teaching portfolio, and allow for continued discussion between class observations. “Communication can make a positive impact on teaching efficacy held by student teachers if only by grounding their beliefs in a more authentic assessment of teaching performance” (Edgar, Roberts, & Murphy, 2009).

Student teachers also desired a combination of variability in feedback and continuity in the focus of feedback over time. Previous studies have found a preference for providing continuity in feedback over time through the employment of the *single-observer* method of student teacher supervision (Rubenstein & Thoron, 2013; Fritz & Miller, 2004). Universities may wish to evaluate their own students’ preferences and needs related to the use of this method to determine whether they, like the students participating in this study, would perceive feedback from multiple supervisors as valuable. As a result of the themes unearthed in this study, several potential observation formats were developed in order to meet the needs of the students while maximizing the time of the university supervisor. These formats are intended to serve as guides for programs as they discuss observation formats among their faculty responsible for university supervision.

Repetitive Team Format: This format of observation requires that all university supervisors attend all visits as a team. While this method does not maximize the time of the university supervisors, it does provide student teachers with both multiple perspectives and consistent feedback areas over time.

Alternative Team Format: This format of observation requires that each university supervisor observe each student teacher one time. University supervisors should develop and maintain a strict observation protocol to be followed during each visit. We recommend that supervisors establish a communication routine during which each supervisor is briefed on the observations made so that feedback can be provided in similar areas with each subsequent visit.

A-B-A Format: This format of observation requires that university supervisors visit each student teacher three times. A “lead” supervisor will observe the student teacher twice to provide consistency over time, while a “secondary” supervisor will observe the student teacher once, providing an alternative perspective regarding the observed teaching practices.

It is recommended that each of these formats be piloted within universities, as their formats were constructed as a result of the findings of this single qualitative study, and therefore cannot be generalized beyond its scope. Discussion among university supervisors may yield additional formats of supervision most appropriate for the institution’s specific needs.

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Lessons Learned: Describing the Preservice Preparation Experiences of Early-Career Award-Winning Agricultural Educators

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Abstract

This study described experiences of National Association of Agricultural Educators (NAAE) Outstanding Young Member award winners. These teachers were asked about the concepts that they were most and least prepared for upon entering the teaching field. A modified Delphi method was used to collect data utilizing three rounds of researcher-developed questionnaires. Round one included open-ended and demographic-type questions. Rounds two and three were constructed using panelists' answers from previous rounds and included Likert-type, five-point rating scales. These award winning teachers felt most prepared to: 1) teach animal science, 2) provide classroom instruction, and 3) teach introductory lessons or units. They felt least prepared to: 1) plan for retirement and 2) manage work-life balance. The findings of this study may provide a framework for teacher education programs and teacher in-service workshops that will aid in more comprehensive training and development of future agricultural education teachers.

Introduction

New agriculture teachers are facing a well-documented battle upon entering the profession (Camp, Broyles, & Skelton, 2002; Duncan, Ricketts, Peake, & Uessler, 2006; Joerger, 2002; Layfield & Dobbins, 2002; Myers, Dyer, & Washburn, 2005; Roberts & Dyer, 2004; Stair, Warner, & Moore, 2012; Washburn & Dyer, 2006). As novice educators navigate through the first few years in the classroom, they encounter troublesome issues including managing time, organizing and planning FFA chapter events and activities, and dealing with student discipline (Myers, Dyer, & Washburn, 2005). If not addressed, these problems may cause them to feel overwhelmed, ineffective, and eventually seek employment opportunities elsewhere (Bennett, Iverson, Rohs, Langone, & Edwards, 2002). The field of agricultural education is facing shortages (Foster, Lawver, & Smith, 2014), and cannot afford for those who have started in the profession to change their minds; increasing the urgency in addressing the concerns of early-career agricultural educators.

The in-service needs of new agricultural educators have been examined in an effort to inform teacher preparation programs of potential topics to add or strengthen in preservice instruction (Birkenholz & Harbstreit, 1987; Duncan, Ricketts, Peake, & Uessler, 2006; Edwards & Briers, 1999; Garton & Chung, 1996; Joerger, 2002; Layfield & Dobbins, 2002; Mundt & Connors, 1999; Roberts & Dyer, 2004; Washburn & Dyer, 2006). The need for this study stems from the desire to collect current data related to the specific preparation needs of early-career agricultural educators in the United States.

In order to describe new agricultural educators' perceived strengths and weaknesses in their preservice preparation programs, we solicited the knowledge and opinions of the 2010-2014 National Association of Agricultural Educators (NAAE) Outstanding Young Member regional award winners. These teachers had been peer-rated as exceptional early-career agriculture teachers from across the nation. We sought input from these individuals regarding their preparation and transition to the classroom in an effort to determine future directions for agricultural education preservice training.

Conceptual Framework

The framework for this study was based on Chapman's (1984) model of teacher retention. We conceptually adapted and simplified Chapman's (1984) model to conform more closely with the subjects and parameters of this study. This portion of a larger study was designed to examine only the adequacy of teacher preparation program influence mentioned in Chapman's (1984) complete framework. Our revised conceptual model for teacher retention is shown in Figure 2.

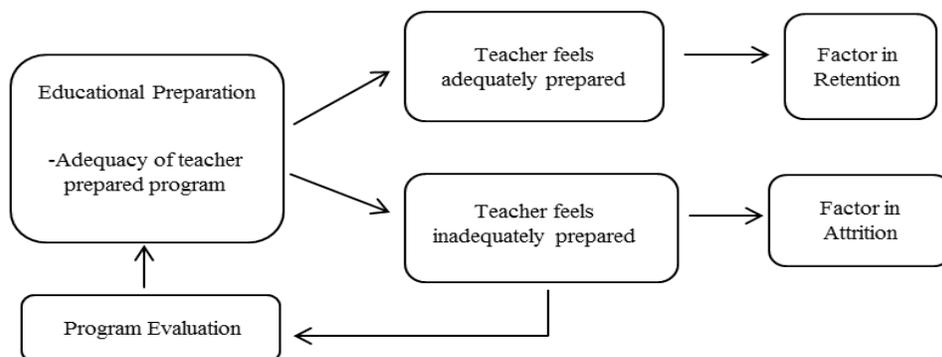


Figure 2: A conceptual model of the influences associated with teacher retention and attrition

The model depicts the perceived adequacy of preparation as a potential contributing factor in the decision to remain in or leave the teaching profession. According to Chapman (1984), if a teacher feels adequately prepared in a subject, they have a better chance of remaining in the teaching profession; if they feel inadequately prepared, they are faced with the choice to conduct a program evaluation teacher and seek additional in-service preparation or may potentially leave the profession. Systematic program evaluations of teachers who do not feel prepared may be important to the improvement of teacher preparation programs as a whole.

Purpose and Objectives

The purpose of this section of the study was to describe the specific teaching activities early-career agriculture teacher award winners felt prepared and unprepared for through their teacher preparation program. To accomplish this purpose, the following research objectives were employed:

1. Identify demographic characteristics of NAAE Outstanding Young Member award winners from 2010-2014.
2. Describe the aspects of teaching agriculture early-career teacher award winners reported feeling most prepared for by their teacher preparation program.
3. Describe the aspects of teaching agriculture early-career teacher award winners reported feeling least prepared for by their teacher preparation program.

Review of Literature

Because of the extensive amount of work an agriculture teacher is tasked with (Torres, Ulmer, & Ashenbrenner, 2008), early-career teachers risk becoming overwhelmed and may experience a type of reality shock in the transition from student teacher to full-time teacher (Veenman, 1984). An examination of this topic requires a review of literature related to challenges of early-career agricultural educators, along with an examination of in-service needs of novice agricultural educators.

The body of literature lends evidence for a strong case related to the time management challenges faced by early-career agriculture teachers. Time management has been noted as a common problem reported by early-career teachers (Boone & Boone, 2009; Lambert, Henry, & Tummons, 2011; Murray, Flowers, Croom, & Wilson, 2011; Torres, Ulmer, & Aschenbrener, 2008; Touchstone, 2015). In a 1999 study of award winning agriculture teachers by Mundt and Connors, three out of eight early agricultural educator problems identified were associated with time management. Understanding more about how prepared early-career agricultural educators feel in regard to time management may shed light on this noted concern, and allow teacher educators to determine if additional preparation in this area is warranted.

Although time management is prevalent in the literature, other challenges have been noted for beginning agricultural educators. A study of novice agricultural educators by Talbert, Camp, and Heath-Camp (1994) revealed that respondents, who differed in both gender and type of preparation reported issues with student discipline and isolation from co-workers. They also faced problems including lesson planning and classroom/laboratory management. (Talbert, Camp, & Heath-Camp, 1994). Myers, Dyer, and Washburn (2005) conducted a Delphi study which yielded 11 major issues facing these early-career agriculture teachers. The top five problems included organizing FFA chapter events and activities, managing student discipline in the classroom, organizing effective alumni chapters, organizing effective advisory committees, and recruiting and retaining alumni members (Myers et. al, 2005).

Determining the in-service needs of preservice teachers through descriptive measures has also revealed areas for growth in teacher preparation programs. Layfield and Dobbins (2002) compared in-service needs of both early and established agricultural educators and concluded that needs differ based on experience level. Among the topics suggested for early-career educators were preparing for Career Development Events (CDEs), developing supervised agricultural experiences (SAEs) for students, and developing adult education programs and advisory committees (Layfield & Dobbins, 2002). Touchstone (2015) outlined in-service needs for beginning agricultural educators in Idaho to include training in time management, classroom management, and program funding. Researchers have also recommended a higher need for in-service education in the fields of instruction, program planning, development and evaluation, and program administration (Garton & Chung, 1996; Joerger & Boettcher, 2000; Stair, Warner, & Moore, 2012). Although many needs assessments of early-career agricultural educators have been conducted, many of them are limited in scope and examine only a single state or region, rather than providing a national-level view.

There may be challenges and in-service needs of novice teachers which are unrealistic for teacher preparation program to address, and there is an expectation that a portion of learning how to be an effective teacher comes from in-service experience (Lytle, 2000). Describing the perceived preparation levels of early-career agricultural educators may provide insight into challenges and areas which new teachers feel additional training during teacher preparation would have benefited their in-service experience. By conducting current research into the perceived preparation levels of early-career agricultural educators on a national level, teacher educators can begin to evaluate teacher education programs and implement positive changes to give in-service support in areas where teachers feel less prepared.

Methods

This descriptive study employed the use of Delphi survey techniques using three rounds of researcher-developed questionnaires. The basic Delphi procedures as outlined by Hsu and Sandford (2007) were adapted to meet the needs of this study and allow for online data collection. Delphi is noted to be highly effective at obtaining a consensus among a sample group of purposively selected individuals (Stufflebeam, McCormick, Binkerhoff, & Nelson, 1985).

Round one of the series of questionnaires included open-ended and demographic questions. The questionnaires from rounds two and three were constructed using panelists' answers from previous rounds using Likert-type five-point rating scales designed to determine a level of agreement determined *a priori*.

Purposeful sampling was used to identify a group of experts who served as the Delphi panel, in line with the recommendation to select a panel which meets the needs of the study (Delbecq, Van de Ven, & Guftafson, 1975; Duffield, 1993; Fink, Kosecoff, Chassin, & Brook, 1991). The Delphi panel in this study included agriculture teachers who received the National Association of Agricultural Educators Outstanding Young Member award as a regional winner from 2010-2014. The Outstanding Young Member (OYM) award is given annually to one NAAE member who has completed less than five years of teaching from each of the six NAAE regions. Winners are determined through peer evaluation of a dossier related to a candidate's effectiveness in instruction, teaching philosophy, experiential learning, student organizations, partnerships, marketing, and professional growth.

We determined that the OYM winners would have the expertise necessary to understand topics which new agricultural educators felt prepared and unprepared for upon entering the profession. Award recipients have demonstrated positive actions in many of the activities deemed necessary to becoming an effective agricultural educator, and have been recognized by their peers as experts in the field of early-career agricultural education. We understand that these experts are not representative of the total population of early-career agricultural educators, and caution must be taken in generalizing the results of this study to a broader scope of individuals.

Potential subjects were identified using the publicly available list of 2010-2014 OYM award winners listed on the NAAE website. An initial email requesting participation was sent to all teachers on the list. A total of $N = 29$ Outstanding Young Member award winners were identified for this study, as one region did not award a winner in 2012. Round one achieved a response rate of 79.3% ($n = 23$). Of the 23 respondents in round one, 100% completed the questionnaire in round two ($n = 23$) and 95.6% responded in round three ($n = 22$). The tailored design method (Dillman, Smyth, & Christian, 2009) was used in distributing and collecting survey data. Questionnaires for each round were distributed with Qualtrics and data were analyzed following the methods described by Hsu and Stanford (2007).

Round One

Round one included demographic questions asking respondents to report age, sex, number of teachers in the agricultural education program, size of the school, number of years teaching, number of different programs taught at, highest degree obtained, and type of certification received. The questionnaire also included five open-ended questions, two of which were directly related to the topic of determining teacher preparation adequacy. The foundation teacher preparation questions included: "*In terms of your teacher preparation program, what aspects of teaching agriculture did you feel most prepared for?*" and "*In terms of your teacher preparation program, what aspects of teaching agriculture did you feel least prepared for?*"

Round Two

The round two questionnaire was developed based on responses from round one. Participants in this round were asked to rank their level of agreement for each statement on a five-point summated scale (1 = Strongly Disagree; 2 = Disagree; 3 = Uncertain; 4 = Agree; 5 = Strongly Agree). Panelists were given the opportunity to expand their answers, provide clarity, or suggest revisions at the end of each question. We established *a priori* that any item receiving a mean score of 3.75 or greater (more than 75% of panelists ranking "agree" or "strongly agree") would be considered to have reached a level of consensus and

therefore would not need to be included in the third and final questionnaire (Buriak & Shinn, 1989; Ramsey & Edwards, 2011).

Round Three

During round three, participants rated their level of agreement with those items which failed to reach a level of consensus in round two (Hsu & Stanford, 2007). All items failing to reach a mean score of $M = 3.75$ were determined to have not reached consensus.

Results

Demographic information was collected from the respondents during round one. Most of the respondents in this study were between 26-30 years of age ($n = 11$) or 31-35 years of age ($n = 10$). A majority of the participants were female ($n = 19$) and had received a Master's degree ($n = 14$). Respondents ranged from having no teaching partners to working in a program with 5 or more agriculture teachers. Many of the respondents reported being either the sole agriculture teacher in their program ($n = 7$) or working in a two-teacher department ($n = 9$). Of the 23 total participants in this study, 91.3% ($n = 21$) received their teaching certification through a traditional teacher preparation program. Complete demographic information is shown in Table 1.

Table 1

Demographic Variables. Selected Teacher Characteristics (n = 23)

Demographic Variables	<i>f</i>	%
Age		
26-30	11	47.80
31-35	10	43.50
36-40	2	8.70
Sex		
Male	4	17.40
Female	19	82.60
Highest Degree Obtained		
Bachelor's	7	30.40
Master's	14	61.00
Educational Specialist	0	0.00
Doctoral	1	4.30
Other	1	4.30
Number of Agriculture Teachers in Current Program		
1	7	30.40
2	9	39.10
3	4	17.40
4	1	4.30
5 or more	2	8.70
Number of Students in School		
<500	8	34.90
500-999	7	30.40
1,000-1,499	3	13.00
1,500-2,000	3	13.00
>2,000	2	8.70
Means of Teacher Certification		
Traditionally Certified	21	91.30

Alternatively Certified	2	8.70
Years of Teaching Agriculture Completed		
1-2	0	0.00
3-4	2	8.70
5-6	9	39.10
7-8	6	26.10
9-10	6	26.10
Racial/Ethnic Heritage		
Non-Hispanic White	22	95.70
Black, Afro-Caribbean, or African America	0	0.00
Latino or Hispanic American	1	4.30
East Asian or Asian American	0	0.00
Number of Schools Taught at as an Agriculture Teacher		
1	10	43.50
2	10	43.50
3	2	8.70
4	1	4.30

Data collection resulted in round one yielded 47 statements for the question “*In terms of your teacher preparation program, what aspects of teaching agriculture did you feel most prepared for?*” These 47 statements were individually analyzed, duplicate and like statements were combined, and compound statements were separated, resulting in 18 statements retained for round two. Round two survey analysis revealed four items which reached the established mean score for consensus. The remaining 14 statements were redistributed to panel experts in round three, none of which reached a level of consensus for round three. The 18 statements for rounds two and three are shown in Table 2.

Table 2

Aspects of Teaching Agriculture OYM Award Winners Reported As Most Prepared for (n = 23)

Factors Most Prepared For	<i>M</i>
Teaching Animal Science ^a	4.17
Classroom instruction ^a	3.96
Introductory lessons/units ^a	3.87
Developing curriculum (Writing lesson plans) ^a	3.78
Teaching FFA ^b	3.61
Differentiated instruction	3.43
Networking	3.43
Classroom management	3.22
Basic agricultural mechanics	3.09
Teaching multicultural students	2.87
Teaching high-level concepts	2.83
Understanding complexities of being an agriculture teacher	2.83
Inquiry-based learning	2.78
Teaching Horticulture	2.78
Time management in and out of classroom	2.65
Completing duties that take place outside class time	2.52
Teaching Forestry	2.30
Teaching Wildlife	2.30

Note. Scale: “1” = “Strongly Disagree,” “2” = “Disagree,” “3” = “Neither Agree nor Disagree,” “4” = “Agree,” “5” = “Strongly Agree.”

^a Denotes statement reaching consensus after round two

^b Denotes statement reaching consensus after round three ($M = 4.14$)

With regard to the question “*In terms of your teacher preparation program, what aspects of teaching agriculture did you feel least prepared for?*” round one resulted in the identification of 56 statements which were analyzed and condensed to 35 statements for round two. Of the 35 statements examined during round two, only two reached consensus. The remaining 33 statements were distributed for round three, none reached a consensus. The statements related to this topic are shown in Table 3.

Table 3

Aspects of Teaching Agriculture OYM Award Winners Reported As Least Prepared for (n = 23)

Factors Least Prepared For	<i>M</i>
Planning for retirement ^a	4.13
Work-life balance ^a	4.13
Filling out applications (Ex: proficiencies and state degrees)	3.74
Management of equipment	3.74
Workload	3.74
Dealing with finances	3.70
Paperwork	3.70
Renewal processes	3.70
How reimbursement funding works	3.65
Managing a greenhouse	3.61
Teaching SAEs	3.61
Agricultural mechanics	3.26
Recruitment of diverse students	3.26
Teacher evaluations (By principals, administrators, etc.)	3.22
Time management	3.22
Communicating with parents	3.13
Following approved course outlines (Approved by school)	3.09
Managing a chapter with a classroom	3.09
Communicating with administration	3.04
Following a textbook/approved outline	3.00
Management of laboratory area	3.00
Career preparation	2.96
Communicating with teaching partner(s)	2.96
Record-keeping	2.96
Scheduling lessons	2.96
Classroom management	2.91
Laboratory courses	2.91
Differentiated instruction	2.83
Working with special needs students	2.83
Importance of marketing the agriculture program	2.70
Planning activities for topics taught	2.65
Making lessons hands-on	2.43
Certification requirements	2.39
Teaching methodology	2.35
Teaching FFA	2.35

Note: Scale: “1” = “Strongly Disagree,” “2” = “Disagree,” “3” = “Neither Agree nor Disagree,” “4” = “Agree,” “5” = “Strongly Agree.”

^a Denotes statement reaching consensus after round two.

Conclusions and Recommendations

This study provided insight into the demographic makeup and preparation perceptions of early-career agricultural educators who have been set apart from their peers as outstanding representatives of quality early-career agricultural educators. Their comments provide a point of reference for conversations related to areas early-career agricultural educators identify as strengths and weaknesses in their respective preparation programs.

It is interesting to note that nearly 75% of the OYM member respondents were female. With the growing number of females in the profession, it would be expected that the percentage of female award recipients would increase, however, the portion of new agricultural educators who are female is not likely to be at three-quarters of the total population. Is there a reason that females are more awarded than their early-career male counterparts? Are equal numbers of males and females seeking the NAAE Outstanding Young Member Award? The large discrepancy in gender of winners certainly warrants further investigation.

Based on the findings of this study, teacher preparation programs are providing adequate information on the subjects of teaching animal science, teaching FFA, classroom instruction, introductory lessons and units, and developing curriculum. Dobbins and Camp (2003) reported the need for more instruction in curriculum development, teaching methods, and teaching techniques. The findings of this study, indicate a potential shift in the in-service needs of early-career teachers since that time, as the panel experts reported feeling adequately prepared by their teacher training programs in teaching related tasks. This study examined only the preparation views of teachers who have been shown to be successful novice agricultural educators. It is possible that their overall success in the field is related to their belief that they were well prepared as classroom instructors. A comparison of the reported classroom teaching preparation of novice agricultural educators who have excelled in the profession in their early years and those who have struggled or left the profession may provide some insight into the role classroom teaching preparation plays in overall agricultural educator performance.

As the OYM winners come from different regions and multiple preparation institutions, their preparation experiences likely varied. This could be the reason that reaching a consensus on topics related to preparation was difficult. It also lends some legitimacy to those items which the nationally representative panel experts were able to reach consensus on. In the opinion of this panel of experts, agricultural education teacher preparation programs as a whole in the country are providing adequate levels of preparation to early-career educators in instructing animal science courses and performing the basic tasks associated with teaching. It is comforting to know that according to this panel, their teacher preparation programs gave them adequate amounts of preparation in classroom teaching tasks.

With regard to the universally agreed upon items, OYM winners felt least prepared in managing work life balance, which is a reflection of the well-documented struggle early-career agricultural educators face with time management. This group echoes the sentiment that new teachers desire assistance in understanding how to effectively balance job responsibilities from a time management standpoint. Myers, Dyer, and Washburn (2005) found that a large majority (70.4%) of agriculture teachers reported struggling to balance their personal and professional lives. Concerted efforts should be taken to determine the best way to increase the teacher preparation in time management to help alleviate this concern among new agricultural educators.

This study highlights several areas for future research. First, it would be interesting to examine the teacher preparation adequacy through a panel of early-career agricultural educators who have decided to leave the profession. This may yield different topics that those who have had successful interactions as a new teacher, and may give even more information to teacher preparation programs who are looking to increase retention among new teachers. Second, it is recommended to replicate this study using cohorts of students from focused regions or from single teacher preparation institutions, which would serve as a more focused assessment of teacher preparation adequacy for specific teacher preparation programs.

Teacher preparation programs are tasked with the challenge of adequately preparing the students to enter a remarkably challenging profession. Understanding how prepared early-career agricultural educators felt in certain areas could help teacher preparation programs as they work evolve content to best suit our country's next generation of agricultural educators

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Early-Career Migration of Agriculture and Human Environmental Sciences B.S. Graduates: Evidence from One Land Grant University

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Abstract

The zip codes of agriculture (n = 346) and human environmental sciences (n = 304) bachelor's degree graduates were examined six to seven years after graduation to describe and compare pre-college and post-college residences (rural versus metropolitan) by major and overall. A majority of agriculture majors were from rural areas (61.6%) and a majority of human environmental sciences majors were from metropolitan areas (55.9%). Majorities of both agriculture (54.9%) and human environmental sciences (70.1%) majors lived in metropolitan areas post-graduation, resulting in a net loss of 100 college-educated rural youth. Among rural graduates, there was no significant difference in the percentage of agriculture (62.4%) and human environmental sciences (57.5%) graduates currently living in rural areas. However, among metropolitan graduates, twice as many agriculture graduates lived in rural areas after graduation as compared to human environmental sciences graduates. Overall, a student from a rural area was 11 times more likely than a metropolitan student to live in a rural area after graduation. Regardless of pre-college residence or major, nearly 40% of graduates lived in their home community after graduation and 60% lived within 50 miles of their home community. Further research is needed to understand the decision-making processes and factors undergirding these residential patterns.

Introduction

The out-migration of the most academically talented youth from rural areas has been dubbed the “rural brain drain” and poses a threat not only to the social and economic vitality of rural communities, but to their very survival (Artz & Yu, 2009; Carr & Kefalas, 2009; McGranahan & Beale, 2002). This out-migration of the “best kids” (Carr & Kefalas, 2009, p. 29) leaves many rural communities with lower levels of human and social capital (Gibbs, 2005; Garasky, 2002), decreasing and aging populations (Lichter & Brown, 2014; Monk, 2007), decreasing tax bases (Gibbs, 2005), and shrinking economies (Pettrin, Schafft, & Meece, 2014).

Agricultural educators have recognized the rural brain drain as a significant impediment to developing and maintaining vibrant and resilient rural communities. According to the *National Research Agenda* of the American Association for Agricultural Education (Doerfert, 2011), “For many years some of the best and brightest youth in rural communities – those who could become future leaders in the community – have relocated to urban areas where employment opportunities are more diverse and attractive” (pp. 27-28).

Agriculture and human environmental sciences as academic disciplines are historically connected to rural America with roots in land grant colleges (Seevers & Graham, 2012). Artz and Yu (2009) found that Iowa State University's Colleges of Agriculture and Life Sciences and Human Sciences attracted the highest percentages of students from rural areas and had the highest percentages of graduates living in rural areas. The researchers posited majors in these colleges were more closely aligned with rural employment opportunities than majors in other colleges. A number of studies (Johnson, Edgar, Edgar, Pate, & Steffen, 2015; McCallaster, Lee, & Mason, 2005; Wildman & Torres, 2001) have found that students from small-town and rural areas make up significant portions of the undergraduate enrollment in departments and colleges of agriculture.

Using survey and institutional data, Artz, Kimble, and Orazem (2013) studied a stratified random sample of 5,416 Iowa State University bachelor's degree agriculture graduates, representative of the 84,917 alumni between 1982 and 2006, to determine the economic returns to agriculture degrees based on employment sector (agriculture or non-agriculture) and job location (rural or urban). The researchers found that only 21% of graduates were employed in agriculture in 2007 and that 60% of the agricultural jobs were located in urban, not rural, areas. In 2007, agriculture graduates working in rural areas made significantly less than agriculture graduates in urban areas working in agricultural (-\$16,427) and in non-agricultural (-\$36,207) jobs. Thus, even for agriculture majors, there appears to be an economic incentive to work in an urban area. Researchers (Korpi & Clark, 2015) have found that the payoff for urban employment is largest for the most educated workers.

In addition to economic rewards for metropolitan employment, Cortwright (2014) noted a general preference among young college graduates for metropolitan living. According to the Demand Institute (2014), 86% of 19 to 29 year-olds preferred to live in urban (38%) or suburban (48%) areas. Further Demi and McLaughlin (2009) found that only 23.8% of rural 11th grade students aspiring to complete a bachelor's degree wanted to live in their rural home communities at age 30. There was a negative correlation between educational aspirations and desire to remain in the home community.

Estes, Estes, Johnson, Edgar, and Shoulders (in press) determined that graduates of the College of Agricultural, Food and Life Sciences, which includes the School of Human Environmental Sciences, at the University of Arkansas, were significantly more likely than graduates of other colleges to both come from rural areas and to live in rural areas after graduation. The current study presents a further analysis of the original data to determine if there are differences between agriculture and human environmental sciences majors in pre- and post-college residential patterns.

Theoretical Framework

Human capital has been defined as, "productive wealth embodied in labour [sic], skills, and knowledge" (Organization for Economic Cooperation and Development, 2001). Human capital theory (HCT) postulates that individuals primarily (but not exclusively) invest their time and money in education and training to develop their human capital with the expectation this investment will result in higher future incomes (Tan, 2014). According to Goldin and Katz (2008), U.S. wage growth for much of the 20th Century was largely driven by increases in human capital through more widespread and higher levels of educational attainment.

According to Korpi and Clark (2015), human capital models of migration posit an individual's decision to move is based on consideration of the relative economic returns the individual expects to receive from moving as compared to staying in place. While there is increasing focus on consumption opportunities and cultural amenities as underlying factors in residential migration, job opportunities and wages are still considered to be the primary determinants of migration (Korpi & Clark, 2015).

HCT provides a logically compelling framework for examining the rural brain drain. Under this scenario, the most academically talented rural youth graduate from high school and leave home to attend colleges and universities (Carr & Kefalas, 2009). Upon graduation, with a degree and major that may or may not even be in demand in the rural home community (Marré, 2014), graduates enter the job market and are confronted with the reality of the rural-metropolitan wage gap, where college graduates employed in rural areas earn significantly less than graduates employed in metropolitan areas (Artz, Kimble, and Orazem, 2013; Kusmin, Giggs, & Parker, 2008). Thus, given the assumptions of HCT, even graduates who desire to live in (or return to) rural areas may ultimately choose, if somewhat reluctantly, to accept employment and consequently live in metropolitan areas (Carr & Kefalas, 2009). Or, rural graduates may make economic sacrifices as the cost of returning to rural communities (von Reichert, Cromartie, & Arthun, 2011).

Purpose and Objectives

The purpose of this study was to describe and compare the migration patterns of 2007 and 2008 agriculture and human environmental sciences graduates from a mid-south land grant university located in a primarily rural state. Specific objectives were to:

1. Determine the percentages of agriculture and human environmental sciences graduates originally from rural and metropolitan communities and determine if there is a significant ($p < .05$) association between major and home community;
2. Determine the percentages of agriculture and human environmental sciences graduates currently residing in rural and metropolitan communities and determine if there is a significant ($p < .05$) association between major and current community;
3. Determine the percentages of agriculture and human environmental sciences graduates currently residing in rural and metropolitan communities, by pre-college community; determine if there are significant ($p < .05$) associations between major and current community, when controlling for pre-college community; and determine if there are significant associations ($p < .05$) between pre-college community and current community, when controlling for major.
4. Determine the percentages of agriculture and human environmental sciences graduates currently residing in home or nearby (≤ 50 miles) communities, when controlling for pre-college community or major; determine if there are significant ($p < .05$) associations between major and currently residing in home or nearby communities, when controlling for pre-college community; and determine if there are significant ($p < .05$) associations between pre-college community and currently residing in their home or nearby communities, when controlling for major.

Methods

The data set for this study was provided by the University of Arkansas Alumni Association in March 2014 and included parents' (or guardians') zip code at the time the student first enrolled in the university, graduates' current zip code, and major for all 2007 and 2008 bachelor's degree ($N = 650$) graduates from the College of Agricultural, Food and Life Sciences, which includes the School of Human Environmental Sciences. According to the University of Arkansas Alumni Association, alumni mailing addresses (and thus zip codes) are updated every 90 days to ensure that all alumni mailings reach the intended recipient at their current address (T. Dover, personal communication). No names or other personal identifiers were provided so as to maintain the anonymity of graduates. Graduates from 2007 and 2008 were selected for study because, at seven or six years, respectively, after graduation, these alumni were likely to have completed any post-graduate education and early career transfers and be settled into fairly stable residential environments (von Reichert, Cromartie, & Arthun, 2014).

Parents' zip codes (at the time the student entered the university) and graduates' current zip codes were used to classify each graduate's pre-college residence and current residence as either rural/small town (hereinafter referred to as rural) or metropolitan based on the Rural-Urban Commuting Area (RUCA) zip code approximation database (Rural Health Research Center [RHRC], n.d.). The RUCA zip code approximation database is based on USDA RUCA codes and was last updated in 2005 (Hart et al., 2005). Primary RUCA codes range from one to 10, with codes one through three considered "metropolitan" and codes four through 10 considered "rural" (USDA, 2012). Under this classification, a zip code was considered rural if it did not contain or partially contain a city of 50,000 or more in population (USDA, 2012).

Data were analyzed using descriptive and non-parametric statistics; the 0.05 *alpha* level was set *a priori* for all tests of statistical significance. The magnitude of all significant associations was described using odds ratios (*ORs*) and their 95% confidence intervals (Stokes, Davis, & Koch, 2012).

Results

The 650 AFLS bachelor's degree graduates in 2007 and 2008 were evenly distributed between years at 50.1% and 49.9%, respectively. The graduates were fairly evenly divided between agriculture (53.2%) and human environmental sciences (46.8%) majors. Overall, the specific majors with the most graduates were apparel merchandising and product development (19.4%), human development and family sciences (16.2%), agricultural business (16.0%), animal science (10.8%), and human development and family sciences (10.8%). A majority of agriculture graduates were male (58.1%) while the predominant majority of human environmental sciences graduates were female (90.5%); overall, 64.2% of AFLS graduates were female and 35.4% were male. Chi square analyses revealed no significant ($p > .05$) differences by year for number of graduates, major (agriculture or human environmental sciences), or gender; thus graduates from the two years were combined for all subsequent analyses.

Objective One

A majority of agriculture majors were originally from rural areas (61.6%) while a majority of human environmental sciences majors were from metropolitan areas (55.9%). As shown in Table 1, there was a significant association ($p < .0001$) between major and pre-college residence. The calculated *OR* of 2.03 ($CI_{95} = 1.49$ to 2.78) indicated that agriculture graduates were approximately twice as likely to be from rural areas as compared to human environmental sciences graduates.

Table 1

Pre-College Residence of Agriculture and Human Environmental Sciences Graduates

Major	Rural ($n = 347$)		Metro ($n = 303$)		χ^2
	<i>f</i>	%	<i>f</i>	%	
Agriculture ($n = 346$)	213	61.6	133	38.4	19.87***
Human Env. Sci. ($n = 304$)	134	44.1	170	55.9	

*** $p < .001$.

Objective Two

Six or seven years after graduation, a slight majority of agriculture graduates (54.9%) and a larger majority of human environmental sciences (70.1%) graduates were living in metropolitan areas (Table 2), indicating a rural to metropolitan migration both by major and overall. There was a significant ($p < .0001$) association between major and current residence, with a higher percentage of agriculture graduates (45.1%) living in rural areas as compared to human environmental sciences graduates (29.9%). The *OR* of 1.92 ($CI_{95} = 1.39$ to 2.66) indicated agriculture graduates were nearly twice as likely as human environmental sciences graduates to currently live in a rural area.

Table 2

Current Residence of Agriculture and Human Environmental Sciences Graduates

Major	Rural (<i>n</i> = 247)		Metro (<i>n</i> = 403)		χ^2
	<i>f</i>	%	<i>f</i>	%	
Agriculture (<i>n</i> = 346)	156	45.1	190	54.9	15.77***
Human Env. Sci. (<i>n</i> = 304)	91	29.9	213	70.1	

*** $p < .001$.

Objective Three

To gain a better understanding of who moves from rural to metropolitan communities, (or, less commonly, from metropolitan to rural communities), students were grouped by pre-college residence and their current residences were examined by major. As shown in Table 3, the majority of rural agriculture (62.4%) and rural human environmental sciences (57.5%) graduates currently lived in rural areas. There was no significant ($p > .05$) association between major and current residence for graduates originally from rural areas.

A majority of both agriculture (82.7%) and human environmental sciences (91.8%) graduates originally from metropolitan areas currently lived in metropolitan areas (Table 3). However, there was a significant ($p < .05$) association between major and current residence for students originally from metropolitan areas. Although small, the percentage of metropolitan agriculture graduates living in rural areas (17.3%) was twice as large as the percentage of metropolitan human environmental sciences graduates living in rural areas (8.2%). The calculated *OR* indicated a metropolitan agriculture graduate was 2.33 ($CI_{95} = 1.15$ to 4.73) times more likely to currently live in a rural area as compared to a metropolitan human environmental sciences graduate.

There was a significant ($p < .0001$) association between pre-college and current residence when controlling for major (Table 3). A majority of rural graduates returned to rural communities (60.5%) and an even larger majority of metropolitan graduates returned to metropolitan communities (87.8%). The calculated *OR* indicated it was 11.02 ($CI_{95} = 7.34$ to 16.53) times more likely that a rural graduate would currently live in a rural area than would a metropolitan graduate.

Table 3

Current Residence of Agriculture and Human Environmental Sciences Graduates by Pre-College Residence

Pre-College residence	Current Residence				χ^2
	Rural (<i>n</i> = 247)		Metro (<i>n</i> = 403)		
Major	<i>f</i>	%	<i>f</i>	%	
Rural (<i>n</i> = 347)					
Agriculture (<i>n</i> = 213)	133	62.4	80	37.6	0.85 ^{NS}
Human Env. Sci. (<i>n</i> = 134)	77	57.5	57	42.5	
Metropolitan (<i>n</i> = 303)					
Agriculture (<i>n</i> = 133)	23	17.3	110	82.7	5.71*
Human Env. Sci. (<i>n</i> = 170)	14	8.2	156	91.8	
Rural (<i>n</i> = 347)	210	60.5	137	39.5	160.22***
Metropolitan (<i>n</i> = 303)	37	12.2	266	87.8	

^{NS}Not Significant.

* $p < .05$. *** $p < .001$.

Objective Four

There were no significant ($p > .05$) associations between major and percentages of graduates currently living in their home communities for either rural or metropolitan graduates (Table 4). Overall, approximately 40% of graduates currently lived in their home communities.

There were no significant ($p > .05$) associations between major and living in a nearby community (within 50 miles of home community) for either rural or metropolitan students (Table 4). Approximately 60% of graduates, regardless of pre-college community or major, lived near their home communities (includes those living in their home community) as measured from center of pre-college zip code area to center of current zip code area.

Finally, there was no significant ($p > .05$) association between pre-college community type and the percentages of students either returning to their home communities or to within 50 miles of their home communities (Table 4). Approximately 4 in 10 graduates originally from rural or metropolitan communities returned to their home communities, while approximately 60% of each group currently lived within 50 miles of their home communities.

Table 4

Agriculture and Human Environmental Sciences Graduates Returning to Home or Nearby (< 50 Miles) Communities by Pre-College Residence

Pre-College Residence Major	Graduates Residing In:					
	Home Community		χ^2	Nearby Community ^a		χ^2
	(n = 251)			(n = 390)		
	<i>f</i>	%		<i>f</i>	%	
Rural (n = 347)						
Agriculture (n = 213)	85	39.9	0.12 ^{NS}	127	59.6	0.08 ^{NS}
Human Env. Sci.(n = 134)	51	38.1		82	61.2	
Metropolitan (n = 303)						
Agriculture (n = 133)	52	39.1	0.13 ^{NS}	82	62.6	0.36 ^{NS}
Human Env. Sci. (n = 170)	63	37.1		99	58.2	

Rural (n = 347)	136	39.2	0.10 ^{NS}	209	60.2	0.02 ^{NS}
Metropolitan (n = 303)	115	38.0		181	59.7	

^aIncludes graduates living in their home community.

^{NS}Not Significant ($p \geq .05$).

Conclusions and Recommendations

The results of this study document the reality of the rural brain drain even among students majoring in agriculture and human environmental sciences at one land grant university. Of the 347 graduates originally from rural areas, only 210 (60.5%) were living in rural areas six or seven years after graduation. Although this loss was partially offset by the 37 metropolitan graduates currently living in rural areas, rural communities experienced a net loss of 100 agriculture and human environmental sciences B.S. graduates from two graduating classes. This out-migration, while less than for other colleges (Authors, in press), represents a significant loss in human capital for these rural communities.

This research also supports Human Capital Theory in that, overall, graduates were drawn to metropolitan areas where the economic returns to education tend to be greater (Artz, Kimble, and Orazem, 2013). However, the migration of rural agriculture and human environmental sciences graduates was not as pronounced as the earnings differentials found by Artz, Kimble, & Orazem, 2013) would suggest, possibly indicating that the non-economic advantages of rural living may somewhat offset the economic advantages (von Reichert, Cromartie, & Arthun, 2011). Further research should be conducted to examine the career and residential decision-making processes of rural graduates.

Agriculture graduates were both significantly more likely ($OR = 2.03$) than human environmental sciences graduates to be from rural areas (61.6% versus 44.1%, respectively) and were more likely ($OR = 1.92$) to

currently live in rural areas (45.1% versus 29.9%, respectively). This is consistent with previous research (McCallister, Lee, & Mason, 2005; Johnson, Edgar, Edgar, Pace, & Steffen, 2015; Wildeman & Torres, 2001).

There was no significant difference between majors in the percentage of rural graduates currently living in rural areas; a majority of both rural agriculture (62.4%) and rural human environmental sciences (57.5%) majors were currently living in rural areas. Conversely, metropolitan agriculture majors were significantly more likely ($OR = 2.33$) than metropolitan human environmental sciences majors to currently live in rural areas. Thus, pre-college residence and major may interact to affect post-college residence only for some metropolitan agriculture majors. Further research should be conducted to better understand the nature of this interaction.

Overall, graduates originally from metropolitan areas were overwhelmingly (87.8%) living in metropolitan areas six or seven years after graduation. Despite the small gain in metropolitan agriculture graduates currently living in rural areas (noted above), rural graduates were 11.02 times more likely than metropolitan graduates to currently live in a rural area. While there was a degree of 'stickiness' associated with pre- and post-college residence for both rural and metropolitan students, this 'stickiness' was much greater for students from metropolitan areas. Thus, metropolitan areas gained relative to rural areas by retaining nearly 90% of their graduates while attracting approximately 40% of rural graduates.

There were no significant differences between agriculture and human environmental sciences graduates or between graduates from rural or metropolitan areas in the percentages of graduates currently living in their home community or within 50 miles of their home community. Almost 40% of all graduates currently lived in their home community while approximately 60% currently lived within 50 miles of their home community. Thus, all majors exhibited an equal propensity to remain close to home, regardless of major or home community. Further research should be conducted to determine whether students are motivated to remain close to home due to the availability of good career opportunities or if graduates accept less-than-optimal career opportunities as a way to achieve their goal of remaining close to home (von Reichert, Cromartie, & Arthun, 2011).

Research should be conducted to determine the specific types of jobs secured by agriculture and human environmental sciences graduates living in rural areas. Are these graduates working in careers that make use of the specific skill sets developed in their degree programs or are students accepting out-of-field employment as the cost of living in a rural area (von Reichert, Cromartie, & Arthun, 2011)?

Land grant universities, especially disciplines in agriculture and human environmental sciences with their historical commitment to rural areas, must play a key role in enhancing rural economic opportunities (Lichter & Brown, 2014). If rural communities are to survive, this role must include economic development activities that will increase the demand for college educated workers in rural communities. Without availability of sufficient high-skill jobs, rural communities will most likely continue to export their most academically talented students to metropolitan areas, while failing to attract significant numbers of metropolitan graduates.

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A Comparison of the Perceptions of Agricultural Education Professors with Undergraduate and Graduate Students Regarding the Importance of Student-to-Student Interaction in Distance Education Classes.

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Abstract

This research sought to determine if professors, undergraduate students and graduate students had similar views regarding the importance of student-to-student interaction in distance education classes. The literature suggests that student-to-student interaction is important in distance learning. However this recommendation is derived from research with face-to-face undergraduate classes from decades ago. Whether or not this recommendation is applicable to distance education students in the 21st century is open to debate. Data were collected from 135 graduate students, 407 undergraduate students, and 85 professors; all of whom had experience with distance education classes. The perceptions of the undergraduate and graduate students were in agreement. Some students desire student-to-student interaction, however the majority of the students don't particularly like or want student-to-student interaction in distance education classes. The perceptions of the professors were dramatically different. They believed student-to-student interaction was desired by students and was importance in distance education classes. This difference in perceptions has implications for course design, student evaluations of teaching, and student satisfaction with distance education programs.

Introduction/Conceptual Framework

There is a substantial difference in student evaluations of distance education classes and face-to-face classes. Typically, distance education classes are rated lower than face-to-face classes (Young & Duncan 2014; Mentzer, Cryan, & Teclehaimanot, 2007; Summers, Waigandt, & Whittaker, 2005; Kelly, Ponton, & Rovai, 2007). Why? Is it possible that professors don't know how to structure and teach distance education classes or are there other factors at play?

It is possible that there are differences in the beliefs of professors and students in regards to what is important in distance education classes. If professors think that certain teaching practices enhance student learning in distance education classes but the student's don't agree, this could contribute to the differences in course evaluations.

One area in which there could be discrepancy in students' and professors' thinking has to do with the perceived importance of student-to-student interaction in distance education classes. It is widely believed that student-to-student interaction is important in distance learning. This is illustrated by Dixson (2010), who writes "One of the recurrent themes in the literature is the effectiveness of using collaborative activities, group discussions, and other forms of student-student interaction" (p. 2). In a typical journal article about distance education one often finds statements such as "The importance of interaction in education is practically a 'given'" (Hillman, Willis, & Gunawardena, 1994, p. 31) and "...interaction [is] an essential element to student learning and to the overall success and effectiveness of distance education" (Sher, 2009, p. 103).

What is the basis for the recommendation that student-to-student interaction is important in distance education classes? Many journal articles looking at interaction in distance education reference the work of Chickering and Gamson (1987) or Chickering and Ehrmann (1996). In 1987, Chickering and Gamson identified seven principles of effective teaching practice for undergraduate education. The seven principles grew out of 50 years of higher education research and have been promoted at many universities. The seven principles included frequent and open communication between faculty members and students, promotion of collaborative student efforts, incorporation of active learning, prompt feedback, efficient use of time, establishing high expectations, and celebrating differences in student learning.

As technology became more commonplace on university campuses, Chickering and Ehrmann (1996) tweaked the seven principles to show how technology could be used to support and enhance these teaching principles. Along with the work of Chickering and colleagues, Moore (1989, 1993, 2013) is widely cited in distance education literature. He identified three types of interaction believed to be important in distance education courses. These are student-to-content interaction, student-to-instructor interaction, and student-to-student interaction.

A question could be raised about the empirical evidence to support the claim that student-to-student interaction is essential in distance education. The seven principles were developed from research on face-to-face undergraduate classes taught during the 1960s, 70s and 80s. The students of that era are different from the students of today. Also, undergraduates are different from graduate students and distance education classes are different than face-to-face classes. Even though the seven principles were tweaked in 1996 to account for technology, the technology of the 1990s is nothing like the technology of today. A number of educators have suggested empirical research is needed to determine if student-to-student interaction in distance education classes is as imperative as claimed. (Arbaugh and Hornick, 2006; Grandzol and Grandzol, 2010; Hutchins, 2003; Liu, 2008).

In the research studies examining interaction in distance education classes, student-to-student interaction is typically not isolated from overall interaction. All three of the interactions described by Moore (1993) are collapsed into one variable. Therefore, the results and conclusions might be skewed. The research tends to show interaction is important but which type of interaction? Of the limited number of research studies focusing specifically on student-to-student interaction in distance education classes, the findings are mixed. Bernard et al. (2009) conducted a meta-analysis of previous research and found 10 studies where student-to-student interaction had a significant effect size on student learning. However, there were 44 studies that found significant effect size for student-teacher interaction and 20 that found the same for student-content interaction. However, Grandzol and Grandzol (2010) found a significant, negative relationship between student-student interaction and course completion rates in six mid-Western community colleges. Kuo, Walker, Belland, and Schroder (2013) found student-teacher interaction and student-content interaction were good predictors of student satisfaction with online courses; however student-student interaction did not contribute to student satisfaction. Arbaugh and Rau (2007) found learner-learner interaction was negatively correlated with course satisfaction among MBA students. Liu's (2008) qualitative study of distance education students found students liked the convenience of taking distance education courses but did not want to put more time and effort into interacting with other students.

One study in agricultural education examined interaction in distance education classes. Kelsey and D'souza (2004) conducted a case study of graduate students who had completed distance education coursework over a two-year period. The participants recognized their interaction with course instructors to be most beneficial and felt student-to-student interaction was minimally important.

Why is it important to examine the delivery of distance education courses? An increasing number of college courses are being delivered via distance. The Sloan Consortium has been tracking online enrollments for the past 10 years (Allen & Seaman, 2013). Between Fall 2002 and Fall 2011, the percent of online enrollment as a percent of total enrollment in colleges and universities had risen from less than 10% to more than 30%. In the last few years college enrollments have remained flat (and actually declined in 2011) but enrollment in distance education classes has continued to climb at a 9-10% annual growth rate. Over 90% of public universities offer online courses and programs. It is clear online learning is growing.

The increasing popularity and enrollment in distance education courses is expected to continue. With the continuing growth in distance education offerings, it is important to critically examine the pedagogical strategies most appropriate in distance education courses.

This study directly addresses Priority 4 "Meaningful, Engaged Learning in All Environments" of the National Research Agenda American Association for Agricultural Education (Doerfert, 2011).

Theoretical Framework

The theoretical framework for this study is drawn primarily from Vroom's (1964) Expectancy Theory and Cognitive Consistency Theory as advanced by Heider (1958). Basically Vroom suggests that people are motivated to act in a certain way based on what they expect the results to be. If students enroll in distance education classes expecting substantial amounts of student-to-student interaction and do not experience that, they will be less motivated to perform well in class and could drop out of the class (and program). However, if their expectations are met, they will perform at a higher level. Expectations influence satisfaction and performance. Therefore, it is important in distance education classes to ascertain student expectations regarding student-to-student interaction; especially since there are conflicting findings and beliefs.

Heider's (1958) Cognitive Consistency Balance Theory utilizes a triadic structure that has an individual (such as the professor) in one corner of the triangle, another individual (such as the student in other corner) and an object (such as an issue or value) in the third corner. If the professor and student have similar views of the object (in this case student-to-student interaction) then balance is achieved and there is harmony and satisfaction. If the two individuals do not have similar views of the object then tension and feelings of unpleasantness will exist which will have a negative impact on the teaching-learning situation.

Purpose and Research Questions

With the increasing emphasis on distance education, many faculty members in agricultural education can anticipate teaching online courses. Because of this, it is important to conduct research on best practices in

distance education. Specifically, this study sought to examine undergraduate and graduate students' expectations regarding student-to-student interaction in distance education courses and compare these with the perceptions of professors. The study focused on one major research question:

Is there a difference in the views of undergraduate students, graduate students and professors regarding the importance of student-to-student interaction in distance education classes?

Methods and Procedures

This research was a descriptive study. Information was gathered from distance education students and professors about their views regarding the importance and desirability of student-to-student interaction in distance education classes. The study was conducted in three phases.

Phase I – Graduate students who had taken one or more courses by distance education from the Department at Agricultural and Extension Education at North Carolina State University during a three year period -- the Fall of 2010 through the Summer of 2013 were surveyed. There were a total of 273 unique students enrolled in distance education classes. However, the accessible population was 220 students because valid e-mail addresses were not available for 53 students. These students were typically “visiting” students from other universities who were assigned a temporary university e-mail address so they could access the course materials. After the course was over, the visiting students' university e-mail account was closed. The university did not have a record of the permanent e-mail address for these students because they were not officially North Carolina State University students.

The instrument (described later) was distributed to the accessible population electronically. First a pre-notice was sent, and then the instrument was sent 24 hours later. A 35% response rate was achieved within two days. A reminder was sent ten days later which boosted the response rate to 46%. One of the problems encountered was the fact that students who graduate can retain their university e-mail address but may never check or use the account. The researchers then searched for alternative e-mail addresses for the non-respondents. A third e-mail was sent to the alternative e-mail address. This effort resulted in a final response rate of 62% for the accessible population.

To ascertain the possibility of non-response error, the 15 first responders were compared with the last 15 responders from the initial two solicitations. Additionally, 15 of the responders from the alternative e-mail solicitation were compared with these two groups. The comparison of early and late responders is advocated by Miller and Smith (1983). The three groups were compared on their mean opinion scores and three demographic variables. No significant differences were found. This signifies the likelihood that non-response error is low.

Phase II – Undergraduate students who were enrolled in a junior level agribusiness management course and a junior level agricultural sales course taught at the University of Florida during the 2014-15 academic year were involved in phase II. Both courses were taught in the fall semester and repeated in the spring semester. There were 253 students enrolled in the two courses in the fall and 226 in the spring semester for a total population of

479 undergraduates. Responses were received from 407 students for a 85% response rate. Because of the strong response rate a follow-up of non-respondents was not conducted.

The reason for the selection of these two courses was that these classes had a critical mass of students and attracted a heterogeneous population of undergraduate students. Of the 407 respondents 33% were majoring in Food and Resource Economics, 14% were in agricultural education and communication, 13% were in animal science, 12% were in various engineering disciplines, 10% were in business fields, and the remaining 18% were in 20 unique majors.

Phase III – Members of the American Association for Agricultural Education (AAAE) were involved in Phase III. Since there is no existing frame of agricultural educators (broadly defined) who teach distance education classes, a request was posted on the listserv of the AAAE asking for individuals who teach distance education classes to self-identify themselves. One hundred and five (105) individuals responded that they taught distance education classes.

The instrument was then sent electronically to these individuals in the fall of 2015. A 60% response rate was received within two days. Four days later a reminder was sent to the non-responders which resulted in an additional 22 responses for a total response rate of 81%.

Instrumentation - The instrument was developed by the researchers after reviewing the literature for pedagogical practices designed to foster student-to-student interaction in distance education courses. While it would have been preferable to use an existing instrument, none were found that focused specifically on student-to-student interaction in distance education classes. Over 50 statements were generated independently by the researchers after a thorough review of the distance education literature. These statements were then evaluated, combined and refined by the researchers to develop an instrument with 20 Likert-type statements. The instrument was then reviewed by five individuals in the university (outside of the department) who had experience in teaching distance education classes and expertise in instrument construction. Two of the expert panelists were specialists in distance education pedagogy and worked for the university's distance education division. They deemed the instrument to possess content validity.

The instrument was created electronically and was field tested with students who had been enrolled in three distance education classes (animal science, technology education, and family development) during the spring of 2013. As a result of the field test, two items were dropped from the final instrument. To assess the internal consistency of the instrument, Cronbach's alpha was calculated on the field test results. The resulting coefficient was .95 which indicates a high degree of internal consistency. The final instrument had 12 positive statements and six negative statements in addition to several demographic questions. Since all of the items on the instrument were specifically designed to look at the construct of student-to-student interaction, a summated mean score was calculated in addition to individual item mean scores.

In phase III of the study (university professors) the wording of the statements were altered slightly. Typically the word "I" was replaced with the word "Students" to reflect the difference in perspectives between students and professors. For example the statement "I gain a lot from interacting with my classmates" was changed to read "Students gain a lot from interacting with their classmates." Another example is "I desire a substantial

amount of student-to-student interaction in my DE courses” was changed for the professors to read “Students desire a substantial amount of student-to-student interaction in their DE courses.” Cronbach’s Alpha was calculated in each phase of the study. In Phase I the alpha coefficient was .95, in Phase II it was .92 and in Phase III the coefficient was .90.

Results/Findings

The students (both undergraduate and graduate) did not deem student-to-student interaction to be important in distance education classes. The mean score for the 18 statements on the instrument was a 2.64 for undergraduate students and a 2.66 for graduate students. These mean ratings fall between the “*disagree*” and “*neither agree nor disagree*” scales on the instrument. Of the 18 statements on the instrument only three received a rating above 3.0 (which is the mid-point) from both the undergraduate and graduate students; but the ratings were barely above a 3.0. When one realizes it was possible for an item to get a mean score of 5.0 for a strongly agree rating, these ratings are not positive. These three statements were “Interaction with other students enhances my learning of the content” (M=3.01 Undergrads, M=3.13 Grads), “I care about other students in my DE courses” (M=3.03 Undergrads, M=3.19 Grads) and “I like the chance to read and comment on my classmates’ discussion board posts” (M=3.04 Undergrads, M=3.05 Grads).

The item with the lowest rating (M=2.08 Undergrads, M=2.05 Grads) was “I would prefer not having ‘group work’ in distance education classes.” The coding on this statement was reversed since it was a negative statement.

The perceptions of the professors was markedly different from those of the students. The grand mean score for all 18 items was a 3.30. There were 12 statements that received scores higher than 3.0 compared with the three statements from the students. Four of the statements received ratings higher than 4.0. They were “I feel students learn more in a course when they have the opportunity to engage with their peers” (M=4.25), “Interaction with other students enhances their learning of the content” (M=4.20), “It is important for students to feel as if they belong to a classroom community” (M=4.04), and “Students gain a lot from interacting with their classmates” (M=4.00).

The items that professors and students disagreed the most on (more than 1 point, see items 3, 7, 9, 10, 12, and 14 in Table 1) tended to be items that were philosophical or pedagogical in nature such as the importance of feeling connected to other students, the value of interaction, and whether interaction promotes learning. The professors believed these concepts were important while the students did not.

There were some items on which the professors and students expressed similar views (less than .3 difference, see items 4, 11, 13, 15, 17, and 18 in Table 1). These items typically were about specific practices that promoted interaction such as group work, discussion boards, online forums, etc. or whether students wanted student-to-student interaction. The students were not positive about these items and the professors are aware of this as shown in their ratings.

Analysis of variance for the grand mean score for each of the three groups revealed a statistically significant difference in the perceptions of the professors and students [$F(2,624)=38.12, p=.0001$]. Post hoc analysis confirmed that the professors were different from the undergraduate and graduate students.

The responses to each statement are found in Table 1 (next page). It should be noted the items were ordered for presentation in this table starting with the items with the highest mean to items with the lowest means. On the instrument the items were in a random order.

Respondents were given the opportunity to provide feedback on an open-ended question about student-to-student interaction. The statement was “If you have any comments you want to share with us about distance education classes or specifically about student-to-student interaction in distance education classes we would welcome them.”

While most respondents did not value student-to-student interaction in distance education courses, a few respondents felt having the opportunity to engage with others made learning more enjoyable and effective. As one student noted, “I found the student-to-student interaction to be a very valuable part of the course. In my opinion, multiple avenues of engagement greatly enhance the learning environment and overall satisfaction with the course.” Another student stated, “I most enjoy learning about the background of my classmates and reading their comments and opinions. Interaction within a class is important to my learning, in my opinion.” But there were many more statements questioning the value of student-to-student interaction.

Respondents identified several challenges to student-to-student interaction in the online environment. These challenges centered around other demands on time, such as full-time jobs and family responsibilities. Several respondents noted they had elected to take online courses since they “work full-time and I’m busy with my family most of the time I’m not working.” Another mentioned, “I don’t feel the need to make friends with people that I will never meet and who also have their own very busy lives.” These various demands contributed to several students’ preference of the “self-paced dynamic.” One respondent actually recognized a benefit to the absence of student-to-student interaction and thought “it freed up my time and allowed me to focus on the assignments and learning objectives instead of going crazy getting group work done and contributing to discussion groups.”

Multiple students questioned the value of discussion forums. One respondent thought requirements mandating a specific number of responses to other postings was a “huge waste (consumption) of valuable time.” Another student felt “the forced interaction of posting mandatory postings in discussion boards leads people to post the required number and that is it.” Most professors were generally in agreement about the importance of student-to-student interaction and had comments such as “It is the instructor's responsibility to build a culture where interaction is valued“ and “I strongly believe that students learn more when they interact and help each other.” However, some professors had different takes on student-to-student interaction. One wrote, “I am beginning to wonder if my efforts to pressure students to engage with one another in discussion forums, chat rooms, etc. is based on MY need for feeling that I'm giving them the interaction that I think they need much more so than the interaction they truly need in order to be successful and to get what they want/need to get from the course.” Another professor said “Our center for technology suggested (strongly insisted) that I add more group

assignments to increase to student interactions. So I made the changes suggested and have never had so many people complain... Long story short my course evaluations were the worst of my professional teaching career.”

A number of professors complained that there was only one instrument for this study. They said that the views of undergraduates and graduates regarding student-to-student interaction was entirely different, thus they needed two different instruments. The professors strongly believed that graduate students embraced and wanted student-to-student interaction while the undergraduates would have opposite views. The researchers found these comments to be interesting since the data previously collected from both undergraduates and graduates revealed no differences in the views of the two groups of students.

Table 1

Perceptions of Distance Education Students and Professors Regarding the Importance of Student-to-Student Interaction in Distance Education Classes

	Undergrads (N=407) M & SD	Grads (N=135) M & SD	Profs (N=85) M & SD
1. I think student-to-student interaction should be a high priority for a distance education class.	3.08 (1.11)	2.96 (1.00)	3.89 (0.95)
2. I like the chance to read and comment on my classmates' discussion board posts.	3.04 (1.01)	3.05 (1.07)	3.00 (1.01)
3. Interaction with other students enhances my learning of the content.	3.01 (1.10)	3.13 (1.04)	4.20 (.63)
4. I care about other students in my DE courses.	3.03 (0.98)	3.19 (0.83)	3.21 (0.84)
5. I feel I learn more in a course when I have the opportunity to engage with my peers.	2.96 (1.03)	3.22 (1.02)	4.25 (0.72)
6. <i>I have better things to do with my time than spending it interacting with other students in the class.</i>	2.95 (0.98)	3.01 (1.00)	3.82 (0.90)
7. I gain a lot from interacting with my classmates.	2.90 (1.03)	2.96 (1.01)	4.00 (0.76)
Statement	Undergrads (N=407) M & SD	Grads (N=135) M & SD	Profs (N=85) M & SD
8. <i>I think the value of cooperative learning (students in small groups learning from each other) is overblown in distance education classes.</i>	2.82 (0.93)	2.76 (0.95)	3.59 (1.07)
9. It is important for me to feel as if I belong to my classroom community.	2.77 (1.05)	2.74 (1.01)	4.04 (0.70)
10. It is important for me to know about the other students in the class.	2.53 (1.01)	2.67 (0.96)	3.71 (0.87)
11. I enjoy participating in on-line forums, bulletin boards, Google hangouts, Skype and other such approaches that promote student-to-student interaction.	2.58 (1.15)	2.64 (1.00)	2.89 (0.91)

12. It is important for me to feel connected to others in my DE courses.	2.64 (1.05)	2.58 (0.89)	3.93 (0.86)
13. I desire a substantial amount of student-to-student interaction in my DE courses.	2.43 (0.97)	2.22 (0.87)	2.58 (0.89)
14. The relationships I have established with other distance education students have continued after the class is over.	2.19 (1.14)	2.07 (0.99)	3.18 (1.01)
<i>15. I prefer to work alone on assignments.</i>	2.18 (0.99)	2.10 (0.91)	2.29 (0.81)
<i>16. I am more concerned about the course content than participating in a classroom community.</i>	2.20 (0.87)	2.2 (1.01)	2.57 (1.04)
<i>17. I would prefer not having "group work" in distance education classes.</i>	2.08 (1.02)	2.05 (1.07)	2.12 (0.89)
<i>18. I only participate in discussion board exchanges if they are a graded component of the course.</i>	2.08 (0.90)	2.27 (0.96)	2.17 (0.90)
Grand Mean	2.64 (0.66)	2.66 (0.69)	3.30 (0.69)

¹Note: The questions in italics were negative statements; therefore in calculating the mean score, these items were reverse coded. The higher the mean, the more positive the respondent is toward student-to-student interaction in distance education classes. SA is *Strongly Agree* and is coded a 5, A is *Agree* and is coded a 4, Neither A nor D is *Neither Agree Nor Disagree* and is coded a 3, D is *Disagree* and is coded a 2 and SD is *Strongly Disagree* and is coded as a 1.

Conclusions and Discussion

In general, students (both undergraduate and graduate) taught at a distance do not desire student-to-student interaction in their classes. Even though there were some students who tended to be positive about having student-to-student interaction, there were more who didn't. The professors who teach distance education classes strongly believe that student-to-student interaction is an essential component of distance education classes. These differences in opinion lead to some thought-provoking questions.

Is the literature wrong? The original declaration (Chickering and Gamson, 1987) that student-to-student interaction is essential for learning comes from literature that is nearly 30 years old but was actually based on research from decades earlier than that. Students, society and technology have changed substantially since then. Yet, very few educators have questioned this edict or sought empirical proof as it relates to distance education interaction except for a few individuals (Liu, 2008; Grandzol & Grandzol, 2010; Hutchins, 2003; Arbarugh & Hornick, 2006). Sir Francis Bacon admonished us to question all previously accepted knowledge. Perhaps it is time to critically examine the existing empirical evidence or conduct new investigations into the efficacy of student-to-student interaction in distance education classes.

Do students know what is good for them? This research did not look at student achievement in their distance education classes (because the responses were anonymous). Student's provided their opinions regarding student-to-student interaction. Is it possible that they dislike student-to-student interaction but yet it is good for them from a learning standpoint? Children may not like to take medicine, yet they need it. So it is possible that student-to-student interaction is a critical component of learning but students' don't appreciate that fact.

Do professors know how to effectively implement student-to-student interaction in their classes? There were numerous student comments about their dislike of posting comments on bulletin boards, interactive forums, doing group projects, and other interaction activities. The general consensus was that it was akin to busy work, the postings lacked depth and insight, and it was difficult doing group work at a distance. Nothing much was gained but the students had jumped through the required interaction hoop. This indicates that professors might not be good at implementing meaningful student-to-student interaction features in their classes. They know they are supposed to do something to promote student interaction and do something; even if it is lame – then they can proudly boast they are good distance education instructors because they can now check off the student-to-student interaction checkbox.

Are professors out-of-touch with reality? If we were observing a student teacher and saw that no one in the class was paying attention to the teacher, but the teacher seemed oblivious of this fact, we would be concerned. We would ask the student teacher if he or she was aware of the lack of attention and what should be done to rectify the situation. This research clearly shows there is a difference of opinion between the students and professors. This difference in opinions or expectations regarding student-to-student interaction in distance education classes might contribute to the previously cited lower student evaluations of distance education classes. According to Heider's Cognitive Consistency theory, this dissonance could explain the lower course evaluations. So what are professors going to do about these research findings?

In examining the findings in light of the other theoretical framework for this study, Vroom's Expectancy Theory, it appears that student-to-student interaction *is not* a major expectation of the students. Students are satisfied with distance education classes in the absence of student-to-student interaction and seem to prefer it that way. Those educators who cling to the views of Chickering and Ehrmann (1996) about the need for student-to-student interaction might want to rethink and re-examine their beliefs. The research of Flowers (2001), Kelsey & D'souza (2004), Grandzol and Grandzol (2010), Kuo, Walker, Belland & Schroder (2013), Arbaugh & Rau (2007) and Liu (2008) would support the findings of this research.

The graduate students surveyed were typically adults with a full-time job and are taking courses part-time. They have family and work responsibilities and see student-to-student interaction as being a major time commitment. Their rating of the instrument items and their comments on the open-ended question lead to this conclusion. They do not believe the advantage of having student-to-student interaction outweighs the time commitment.

Overwhelmingly students are more concerned with the course content than they are with building or participating in a classroom community. Students take distance education courses for a variety of reasons. Given that many students work full-time and attend college part-time via distance education, they may prefer independent work and do not want to rely on someone else. If a grade is based on interaction with other students using discussion threads or online group work, then the stress of relying on others increases. With the realization that different students have different needs, learning styles and available time, trying to coordinate meaningful student-to-student interaction may only be increasing the stress on students in the course and not enhancing the learning.

Based upon the findings one could conclude having extensive student-to-student interaction in a distance education class does not need to be a high priority for the instructor. It is recommended that if a teacher chooses

to incorporate student-to-student activities into a class, that it be voluntary. There are some students who do desire and benefit from student-to-student interaction; so they should have the opportunity to engage in those activities. However, for the majority of the students who do not want student-to-student interaction, they should not be forced to engage in those activities.

This study did not look at student achievement. While students may prefer a more individualized approach to online courses, it may not always translate into the most robust learning environment. Additional research should examine the student performance and comprehension in courses with a great deal of student-to-student interaction as compared to courses with minimal or no student-to-student interaction.

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Assessing the relationship of teacher self-efficacy, job satisfaction, and perception of work-life balance of Louisiana agriculture teachers

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Abstract

Agricultural education has faced a national shortage of qualified teachers since at least 1965. Current initiatives, such as NAAE's TeachAg Campaign, seek to alleviate this shortage through recruitment of new agriculture teachers. However, turnover in the teaching profession remains a problem, with attrition rates approaching 60% reported in some research studies. Factors such as teacher self-efficacy, job satisfaction, and work-life balance have been reported to influence teachers' decision whether or not to remain in the profession. The purpose of this study was to describe Louisiana agriculture teachers' levels of teacher self-efficacy, job satisfaction, and perception of work-life balance. Additionally, this study sought to determine if relationships existed between these variables. Overall, teachers reported being efficacious in their chosen career and satisfied with their job. Additionally, these teachers reported being able to achieve balance in their career and that their family life did not interfere with work. These teachers were undecided as to whether work interfered with their family. It is recommended that further research should be completed to understand why this, and other, studies report teachers to be satisfied and efficacious, yet a high turnover of agriculture teachers exists. Further, teachers who excel at balancing teaching and their personal lives should be utilized as workshop presenters to assist other teachers in attaining balance.

Introduction

A critical shortage of teachers exists in the United States today (Kantrovich, 2007; Fandel, 2007; Walker, Garton & Kitchel, 2004). The National Education Association (NEA) indicated in 2004 that over one million teachers were expected to retire, signifying the need for an additional two million teachers over the next 10 years to fill the demand for qualified educators (NEA; as cited in Walker et al., 2004). This number has more than tripled since, with 3.4 million retirees that were estimated from 2013 (Phillip, 2011). As of 2001, almost 50% of educator turnover has been due to retirement and teacher relocation, with more than 50% separating from the educational profession overall (Wirt et al., 2005). According to Lambert (2006) "the number of new teachers who leave the profession has hovered around 50% for decades" (p. 1). Further, those educators coming into the profession with alternative forms of teacher certification have experienced an attrition rate of 60% (Darling-Hammond, Berry, & Thoreson, 2001), indicating that the retention and enticement of quality teachers to enter the profession is of epic concern (Walker et al., 2004).

Core subjects are not the only areas experiencing high attrition rates in the education profession. Every high school subject area (i.e., science, math, English as a Second Language etc.) has experienced concerns, with the exception of social studies and physical education (Fandel, 2007). A shortage of highly qualified educators exists in agricultural education as well (Camp, Broyles, & Skelton, 2002; Kantrovich, 2007). Camp et al. (2002) identified that concern existed with the retention of quality agricultural educators beginning in 1965, and it has continued to be a concern. The National Association of Agricultural Educators (NAAE) has documented this deficiency of agricultural educators and is actively pursuing qualified educators as well as new teachers through the National Teach Ag Campaign (A. P., 2010). As a result, the National Teach Ag Campaign directly impacted 46 states in 2014 (National Teach Ag campaign: 2014 year in review, 2014).

The recruitment of agricultural educators by NAAE is a positive move towards solving the teacher attrition crisis, but "[i]t is, perhaps, no surprise then that retention rather than recruitment of teachers has become a pressing concern. . ." (Smethem, 2007, p. 466). On the subject of retention, Darling-Hammond (1999) posited

that 30% of all beginning in-service teachers will leave the profession within their first five years, where Johnson (2004) identified the attrition rate being as high as 50%. These statistics are alarming, making an understanding of the reasons behind attrition in the agricultural education profession a critical concern (Crutchfield, Ritz, & Burris, 2013).

Researchers have identified that a number of reasons exist that influence teachers leaving the profession, including (a) low self-efficacy concerns, (b) low motivation, (c) a demoralizing work environment, as well as (d) burnout (Boone & Boone, 2009; Borman & Dowling, 2008; Brill & McCartney, 2008; Cano & Miller, 1992; Castillo & Cano, 1999; Clark, Brown, & Ramsey, 2012; Epps, Foor, & Cano, 2010; Kitchel et al., 2012; Newcomb, Betts, & Cano, 1987; Thieman, Henry, & Kitchel, 2012). Common issues researched in the last decade have targeted commitment to teaching, job satisfaction, as well as federal involvement targeting school improvement (Boone & Boone, 2009; Borman & Dowling, 2008; Blackburn & Robinson, 2008; Brill & McCartney, 2008; Clark et al., 2012; Epps et al., 2010; Kitchel et al., 2012; Thieman et al., 2012). Teachers nationally have been targeted by legislation that has “. . . proposed cutting collective bargaining rights, eliminating tenure and slashing teacher benefits”, decreasing the desire for those training for a career in education to pursue teaching at all (Phillip, 2011, p. 7).

A primary concern related to teacher attrition has been found to be self-efficacy (Pintrich & Schunk, 1996). As defined by Bandura (1994), self-efficacy is an individual's “. . . beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives” (p. 1). Additionally, a lack of self-efficacy can impact a person's ability to cope with difficult situations, affecting their motivation toward educational responsibilities, thereby diminishing their academic success (Bandura, 1995). Self-efficacy concerns contributing to teacher attrition revolve around what has been termed as a *can-do* thought process (Schwarzer, 1992). Educators that internalize a high level of self-efficacy are more likely to succeed, continuing in their chosen profession, where conversely they are more likely to fail when low levels of self-efficacy exist (Pintrich & Schunk, 1996; Saklofske, Michaluk, & Randhawa, 1988). Further, Glickman and Tamashiro (1982) found that low teacher self-efficacy led to a reduction in commitment to teaching, which led to teachers leaving the profession.

Research by Crutchfield et al. (2013) sought to determine what factors regarding agricultural educator retention existed with teachers who were currently employed and had taught for a minimum of four years during the 2009–2010 school year. The study investigated relationships “. . . between work engagement, work-life balance, occupational commitment, and personal and career factors as related to the decision to remain in the teaching profession” (Crutchfield et al., 2013, p. 1). As a result of the findings, it was implied by researchers that teachers participating in the study were able to remain in the profession when they were able to balance their work and family life and be able to uphold their work commitment. Additionally, those that assumed “. . . too much responsibility for activities beyond classroom instruction, . . . [realized] . . . the potential for negative impact on their commitment to remain in the profession” (Crutchfield et al., 2013, p. 10). Further, teachers have reported that long work hours without adequate compensation were taxing on their ability to balance work and family obligations (Murray, Flowers, Croom, and Wilson, 2011).

So why do teachers remain in the classroom (Crutchfield et al., 2013)? Both intrinsic and extrinsic factors have been documented as viable ways for in-service teachers to remain in their chosen career (Inman & Marlow, 2004; Nieto, 2003). Approximately, fifty percent of teachers surveyed with 4–9 years of teaching experience identified salary as a factor that led them to remain in the teaching profession (Inman & Marlow, 2004). Inman and Marlow (2004) also identified collegiality as an important retention factor, particularly among beginning teachers. A positive work environment can influence beginning teachers' decision to stay in the profession (Inman and Marlow, 2004). Further, job security has also been found to be an important retention factor for both new and experienced beginners. Research by Nieto (2003) targeted intrinsic feelings of teachers who were committed to the common goal in the education of adolescents as a primary factor in educator retention, which

in turn allowed for an increase in teacher self-efficacy and dedication when working with at-risk students (Gibson & Dembo, 1984; Soodak & Podell, 1996; Rocca & Washburn, 2006).

Pedagogical understanding dictates that the longer a teacher is in the profession, the more effective they are compared to their novice counterparts (Day, Sammons, Kington, Gu, & Stobart, 2006). As such, the costs associated with teacher attrition can be measured not only monetarily through the associated costs of recruiting and retaining qualified teachers, but through the costs associated with a less than effective learning environment (Allen, & Education Commission of the States, Denver, CO., 2005). Which begs the question. How can teachers effectively balance their careers and personal life, thus decreasing attrition in the profession (Crutchfield et al., 2013)?

Conceptual Frame

This study was framed through the lenses of both the Conservation of Resources (CoR) theory and the Attribution theory. The CoR theory states that “. . . people seek to obtain, retain, and protect that which they value (e.g., material, social, personal, or energetic resources)” (Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007, p. 276). Academics utilize CoR theory when analyzing burnout causes of educators. Further, this theory has been useful in the analysis of the home versus work-life balance of educators (Grandey & Cropanzano, 1999), and the stresses associated with it (Hobfoll, 1989).

Brooks and Clarke (2011) posited that “Attribution theory is a form of 'naïve' or 'commonsense' psychology that was conceived . . . to explain how people interpret events or other people's motives, and how their behaviours [sic] are affected by these interpretations” (p. 34). Obvious reasons exist for why people behave in certain ways (Weiner et al., 1971) and the attribution theory targets the dimensions of stability, controllability, and locus of control as the dimensions of both internal and external attributes (Weiner et al., 1971). The theory affirms that attributions are essential to the enthusiasm of individuals allowing them to manage concerns associated with internal and external stress effectively (Hong, Chiu, Dweck, Lin, & Wan, 1999), providing an effective theory to analyze agricultural educators perceptions of their job satisfaction when compared to self-efficacy and their job-life balance.

Purpose of the Study

The twofold purpose of this study was to describe Louisiana agriculture teachers' levels of teacher self-efficacy, job satisfaction, and perception of work-life balance. Additionally, this study sought to determine if relationships existed between these variables. The following research objectives guided the study:

1. Describe the personal and professional characteristics of Louisiana agriculture teachers in terms of age, gender, marital status, educational level, years of teaching experience, annual salary, and number of children.
2. Describe the levels of teacher self-efficacy (i.e., overall teacher self-efficacy, student engagement self-efficacy, instructional practices self-efficacy, and classroom management self efficacy) of Louisiana agriculture teachers.
3. Describe the level of job satisfaction of Louisiana agriculture teachers.
4. Determine Louisiana agriculture teachers' perceptions of their work-life balance (i.e., creation of balance and perception of conflict between work and family).
5. Explain the relationships between teacher self-efficacy, job satisfaction, and perception of work-life balance.

Methods/Procedures

Population and sampling

The target population for this descriptive correlational study was agriculture teachers who attended Louisiana agriculture teacher's conference in the summer of 2014. The total number of teachers who registered and attended the annual conference was 152. The researchers attended the first general session to collect data face-to-face using a hardcopy questionnaire. Questionnaires were collected from 105 teachers yielding a 69% response rate. It should be noted that little research regarding the study's dependent variables (i.e., self-efficacy, job satisfaction, and work-life balance) as they pertain to Louisiana agriculture teachers has been examined in the past. As such, this study should not be considered representative of the entire teacher population. This study strictly serves as a starting point to begin to understand teacher self-efficacy, job satisfaction, and work-life balance among Louisiana agriculture teachers better.

Instrumentation

The instrument used in this study comprised of four sections. Face and content validity were established by a panel of experts comprised of three agricultural education faculty members, one agricultural education doctoral student, and one practicing agriculture teacher who was not included in the study's population. Part I was the long form of the Teacher' Sense of Efficacy Scale (TSES) (Tschannen-Moran & Woolfolk Hoy, 2001). The TSES is comprised of 24 items that measure teacher self-efficacy across three constructs (a) student engagement, (b) instructional strategies, and (c) classroom management. The nine-point Likert-type items were scaled as, 1 = *Nothing*, 3 = *Very Little*, 5 = *Some Influence*, 7 = *Quite A Bit*, and 9 = *A Great Deal*.

The second part of the instrument was the Brayfield-Rothe (1951) Job Satisfaction Index (JSI). The JSI consists of 14 items to assess job satisfaction. The five-point Likert-type scale was anchored as, 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Undecided*, 4 = *Agree*, and 5 = *Strongly Agree*. Seven of the items were negatively worded, as such, these items were reverse coded prior to calculating the grand mean of the job satisfaction construct.

The third section of the instrument measured the teachers' perceptions of work-life balance factors using 11 items. The five-point Likert-type scale was anchored as, 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Undecided*, 4 = *Agree*, and 5 = *Strongly Agree*. Specifically, four items from Chaney (2007) were used to determine the teacher's perceptions of creating work-life balance. Further, eight items from Gutek, Searle, and Klepa (1991) were used to measure conflict between work and family. These eight items were reverse coded in order that a high score reflected high conflict. The final part of the instrument was a researcher developed demographics section (i.e., age, gender, marital status, educational attainment, years in the profession, annual salary, and number of children).

Cronbach's alpha was calculated *post-hoc* for each section of the instrument that contained scaled items. Greater than acceptable reliability estimates (Santos, 1999) for the TSES ($\alpha=.93$) and JSI ($\alpha=.91$) were calculated. Acceptable reliability estimates (Santos, 1999) were found for the perception of creating balance ($\alpha=.77$) and perception of conflict with family and work ($\alpha=.79$) sections of the instrument.

Data Analysis

Data affiliated with objective one were analyzed through descriptive statistics. Specifically, minimum, maximum, frequencies, percentages, means, and standard deviations were used to understand these data better. Data related to research objectives two, three, and four were analyzed via means and standard deviations. The Pearson product-moment correlation coefficient was calculated to address the fifth research objective. The

strength of relationships was described using Davis' (1971) conventions: $.01 \geq r \geq .09 = \textit{Negligible}$; $.10 \geq r \geq .29 = \textit{Low}$; $.30 \geq r \geq .49 = \textit{Moderate}$; $.50 \geq r \geq .69 = \textit{Substantial}$; and $r \geq .70 = \textit{Very Strong}$.

Findings

Research objective one sought to describe the personal and professional characteristics of Louisiana agriculture teachers (see Table 1). Most ($f = 78$; 74.3%) of the teachers were male and were married ($f = 82$; 78.1%). The bachelor's degree was most common ($f = 58$; 55.2%), followed by the master's degree ($f = 41$; 39.0%). The majority ($f = 79$; 75.2%) of the teachers selected over \$50,000 as their annual salary.

Table 1

Personal Characteristics of Louisiana Agriculture Teachers (n = 105)

Variable	<i>f</i>	%
Gender		
Male	78	74.3
Female	27	25.7
Marital Status		
Married	82	78.1
Not Married	23	21.9
Education Level		
Bachelors	58	55.2
Masters	41	39.0
Specialist	3	2.9
Doctoral	2	1.9
Other	1	1.0
Annual Salary		
\$20,000 – 29,999	1	1.0
\$30,000 – 39,000	1	1.0
\$40,000 – \$49,000	17	16.2
Over \$50,000	79	75.2
Non-Response	7	6.7

Table 2 depicts the age, years of teaching experience, and the number of children of Louisiana agriculture teachers. The age of these teachers ranged from 21 to 77 with an average of just under 42 years. Teaching experience ranged from zero to 43 years with just over 15 years being the average length of tenure.

Table 2

Age, Years of Teaching Experience, and Number of Children of Louisiana Agriculture Teachers (n = 105)

Variable	<i>Minimum</i>	<i>Maximum</i>	<i>M</i>	<i>SD</i>
Age	21	77	41.76	11.40
Years of Teaching Experience	0	43	15.19	10.13
Number of Children	0	10	1.91	1.49

The second research objective was concerned with describing Louisiana agriculture teachers' level of teacher self-efficacy (see Table 3). Overall, these teachers indicated they had *Quite A Bit* ($M = 7.02$; $SD = .82$) of influence in various teaching situations as measured by the TSES. The teachers also perceived *Quite A Bit* of influence for each of the three teacher self-efficacy constructs identified by the TSES.

Table 3

Teacher Self-Efficacy of Louisiana Agriculture Teachers (n = 105)

Teacher Self-Efficacy Category	<i>M</i>	<i>SD</i>
Overall Teacher Self-Efficacy	7.02	.82
Student Engagement	6.61	.85
Instructional Strategies	7.25	.86
Classroom Management	7.27	.99

Note. 1 = Nothing; 3 = Very Little; 5 = Some Influence; 7 = Quite A Bit; 9 = A Great Deal.

Research objective three sought to describe the level of job satisfaction of Louisiana agriculture teachers. The job satisfaction grand mean ($M = 3.58$; $SD = .38$) was within the real limits of *Agree* (see Table 4). Regarding individual items, it should be noted that items one through eight were positively worded and items eight through 14 were negatively worded. The highest rated ($M = 4.55$; $SD = .62$) positively worded item was *My job is interesting enough to keep me from getting bored* and was within the real limits of *Strongly Agree*. The remaining positively worded items all had mean scores within the real limits of *Agree*. The negatively worded items *I am disappointed that I ever took this job* ($M = 1.38$; $SD = .65$) and *I definitely dislike my work* ($M = 1.41$; $SD = .65$) had mean scores within the real limits of *Strongly Disagree*. The remaining negatively worded items' mean scores were within the real limits of *Disagree*.

Table 4

Level of Job Satisfaction of Louisiana Agriculture Teachers (n = 105)

Item	<i>Min.</i>	<i>Max.</i>	<i>M</i>	<i>SD</i>
1. My job is interesting enough to keep me from getting bored.	2.0	5.0	4.55	.62
2. I find real enjoyment in my work.	2.0	5.0	4.31	.75
3. I consider my job pleasant	2.0	5.0	4.20	.71
4. I feel satisfied with my job.	2.0	5.0	4.16	.72
5. Most days I am enthusiastic about my work.	1.0	5.0	4.14	.84
6. I like my job better than the average worker does.	1.0	5.0	4.11	.91
7. I feel happier in my work than most other people.	1.0	5.0	4.05	.90
8. My friends seem more interested in their jobs than I am. *	1.0	5.0	2.20	.93
9. Each day of work seems like it will never end. *	1.0	5.0	2.05	.93
10. I am often bored with my job. *	1.0	5.0	1.85	.90
11. Most of the time, I have to force myself to go to work. *	1.0	5.0	1.82	.96
12. My job is uninteresting. *	1.0	5.0	1.71	1.00
13. I definitely dislike my work. *	1.0	4.0	1.41	.65
14. I am disappointed that I ever took this job. *	1.0	5.0	1.38	.65
*Grand Mean	-	-	4.22	.57

Note. Real limits: 1.00–1.49=Strongly Disagree; 1.50–2.49=Disagree; 2.50–3.49= Undecided; 3.50–4.49=Agree; 4.50–5.00=Strongly Agree.

* Reflects grand mean calculated with marked items reverse scored.

Research objective four was concerned with determining Louisiana teachers' perceptions of work-life balance. Table five depicts the teacher's perception of creating balance. The grand mean score ($M = 3.91$; $SD = .65$) was within the real limits of *Agree*.

Table 5

Louisiana Agriculture Teachers' Perceptions of Creating Balance (n = 105)

Item	Min.	Max.	M	SD
1. You are able to balance quality time between your work and your family/personal commitments.	1.0	5.0	3.53	1.08
2. You are able to balance work demands without unreasonable compromises on family/personal responsibilities.	1.0	5.0	3.42	1.07
3. You are able to have a fulfilling personal life and adequately perform your work responsibilities.	1.0	5.0	3.70	1.00
4. A good work-life balance for agriscience teachers helps provide a more effective and successful agricultural education profession.	2.00	5.0	4.37	.67
5. A good work-life balance for agriscience teachers helps retain teachers in the profession.	2.00	5.0	4.55	.59
Grand Mean	-	-	3.91	.65

Note. Real limits: 1.00–1.49=Strongly Disagree; 1.50–2.49=Disagree; 2.50–3.49= Undecided; 3.50–4.49=Agree; 4.50–5.00=Strongly Agree.

Table six lists the teacher's responses regarding the perceptions of conflict between work and family. Regarding work interference with family (WIF), the mean score ($M = 3.12$; $SD = .98$) was within the real limits of *Undecided*, while the mean score ($M = 1.96$; $SD = .98$) of family interference with work (FIW) was within the real limits of *Disagree*. The grand mean of the perception of conflict ($M = 3.46$; $SD = .67$) was within the real limits of *Undecided*.

Table 6

Louisiana Agriculture Teachers' Perceptions of Conflict between Work and Family (n = 105)

Conflict Type	Min.	Max.	M	SD
Work Interference with Family (WIF)				
1. After work, I come home too tired to do some of the things I'd like to do.	1.00	5.0	3.37	1.16
2. On the job, I have so much work to do that it takes away from my personal interests.	1.00	5.0	3.10	1.18
3. My family/friends dislike how often I am preoccupied with my work while I am at home.	1.00	5.0	2.95	1.16
4. My work takes up time that I'd like to spend with family/friends.	1.00	5.0	3.07	1.22

WIF Mean*	-	-	3.12	.98
Family Interference with Work (FIW)				
5. I'm often too tired at work because of the things I have to do at home.	1.00	5.0	2.31	1.02
6. My personal demands are so great that it takes away from my work.	1.00	5.0	2.18	.95
7. My administration and peers dislike how often I am preoccupied with my personal life while at work.	1.00	4.0	1.73	.81
8. My personal life takes up time that I'd like to spend at work.	1.00	4.0	1.61	.78
*FIW Mean	-	-	1.96	.66
Conflict Grand Mean*	-	-	3.46	.67

Note. Real limits: 1.00–1.49=Strongly Disagree; 1.50–2.49=Disagree; 2.50–3.49= Undecided; 3.50–4.49=Agree; 4.50–5.00=Strongly Agree.

*Grand mean calculated with items reverse scored so that high score reflects high conflict

The fifth research objective sought to explain the relationship between teacher self-efficacy, job satisfaction, and work-life balance (perception of creating balance, perception of conflict). Positive, substantial relationships were found between *Overall Teacher Self-Efficacy* and *Job Satisfaction* ($r = .59$) and *Perception of Creating Balance* and *Overall Perception of Conflict* ($r = .65$). Positive, moderate relationships were detected between *Job Satisfaction* and *Overall Perception of Conflict* ($r = .43$) and *Job Satisfaction* and *Perception of Creating Balance* ($r = .31$). Positive, low relationships were found between *Overall Teacher Self-Efficacy* and *Perception of Creating Balance* ($r = .26$) and *Overall Teacher Self-Efficacy* and *Overall Perception of Conflict* ($r = .23$).

Table 5

Relationships between Teacher Self-Efficacy, Job Satisfaction, and Work-Life Balance

Characteristic	1	2	3	4
1. Overall Teacher Self-Efficacy	-	.59	.26	.23
2. Job Satisfaction		-	.31	.43
3. Perception of Creating Balance			-	.65
4. Overall Perception of Conflict				-

Note. Only statistically significant ($p < .05$) correlation coefficients reported

Conclusions and Discussion

The typical teacher who responded in this study is male, 42 years of age, married, has two children, and has over 15 years of professional experience. Further, these teachers averaged over \$50,000 as their annual salary. These teachers are similar to teachers involved in other studies of work-life balance (Crutchfield et al., 2013; Sorenson & McKim, 2014). Regarding perceived teacher self-efficacy, agriculture teachers in Louisiana are efficacious in their chosen career. Per the theory of teacher self-efficacy, these teachers believe their actions will lead to the completion of specific teaching tasks (Bandura, 1997; Tschannen-Moran & Woolfolk-Hoy, 2001). Further, high levels of teacher self-efficacy could increase the likelihood these teachers will persist when faced with challenging situations (Bandura, 1997; Tschannen-Moran & Woolfolk Hoy, 2001). These findings are consistent with previous research on agriculture teacher self-efficacy (Blackburn & Robinson, 2008; Knoblock & Whittington, 2003, Whittington, McConnel, & Knobloch, 2003; Wolf, 2011).

Agriculture teachers in Louisiana reported they are satisfied with their current employment. This finding supports previous research in agricultural education (Blackburn & Robinson, 2008; Kitchel et al., 2012; Walker et al., 2004). Per Attribution theory, teachers who are satisfied with their chosen career should be able to effectively manage stress that may arise during the course of the job; thus, providing further stability in their chosen profession, especially during times of stress (Hong et al., 1999).

Overall, the teachers did not perceive they have the ability to achieve balance. This finding aligns with Sorenson and McKim (2014) who reported only moderate levels of WLB among teachers in Oregon. However, this is inconsistent with the findings of Crutchfield et al. (2013) who reported that teachers in the southern region of the United States believed they could influence control to achieve balance. Concurrent with previous research (Crutchfield et al., 2013), agriculture teachers in Louisiana did not agree or disagree that work interferes with family. Additionally, these teachers indicated they feel family does not interfere with their work responsibilities.

A strong, positive relationship was found between overall teacher self-efficacy and job satisfaction, indicating the more efficacious a teacher is, the more satisfied he or she is with the job. This finding aligns with Blackburn & Robinson (2008) who reported strong, positive relationships between the self-efficacy constructs and job satisfaction among most teachers. Perhaps teachers in Louisiana have had quality mastery experiences that have led to a positive outlook on their job, leading to increased self-efficacy (Badura, 1997) and job satisfaction.

A positive, moderate relationship was found between job satisfaction and the perception of creating balance, similar to the findings of Sorenson and McKim (2014). This may imply that striking a balance between work and family time is an important component of a satisfied agriculture teacher. Interestingly, a positive, moderate relationship was found between job satisfaction and the overall perception of conflict. Crutchfield et al. (2013) found no relationship between these two constructs. Could it be that as conflict increases between work and family, some teachers gravitate toward spending more time at work in order to actually increase their satisfaction? When looking at this question through the lens of the conservation of resources theory (Bakker et al., 2007), the tendency of people to protect what they value could potentially serve as a friction point between work and home life, further serving as a point of contention between the two.

Recommendations

Future research should focus on individuals who have left the agricultural education profession to determine if low levels of job satisfaction, teacher-self efficacy, or work-life balance influenced their decision to leave. The results from this study and others show that teachers are efficacious, satisfied with their job, and perceive they can achieve balance (Blackburn & Robinson, 2008; Crutchfield et al., 2013; Kitchel et al., 2012; Sorenson & McKim, 2014). However, a high turnover rate among agriculture teachers still exists (Walker et al., 2004).

Additional research is needed to understand the influence that demographic characteristics may have on work-life balance, job satisfaction, and teacher self-efficacy. For instance, does the number of children a teacher has determine his or her perception of conflict? Do males and females view conflict differently? Additionally, occupational commitment should be an added measure for future studies. Further, a longitudinal study could be designed to determine how these variables change through the course of an academic year. A qualitative study could be designed to understand the relationship between teacher self-efficacy, job satisfaction, and work-life balance.

The results of this study should be shared with state agricultural education leaders, as well as practicing agriculture teachers. The maximum scores of the items within the perception of the conflict construct indicated that some teachers perceive conflict between their home life and teaching. Teachers who excel at achieving balance should be utilized to present workshops to share their strategies with those who may be struggling in

this area, as well as beginning teachers. Further, as a preventative measure, teacher educators in Louisiana should also incorporate strategies for achieving work-life balance when working with pre-service agriculture teachers.

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Teachers' Beliefs about the Purpose of Agricultural Education and its Influence on their Pedagogical Content Knowledge

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Abstract

The purpose of this grounded theory study was to conceptualize the pedagogical content knowledge (PCK) of experienced agriculture teachers in the plant sciences. The overarching theme that emerged during data collection and analysis was the influence of beliefs on participants' PCK. This finding guided subsequent data collection and analysis that focused on what was shaping the participants' PCK in plant sciences. The integrated beliefs system was the driving force in shaping the participants' PCK and the primary component of this belief system was the participants' beliefs about the purpose of agricultural education. These individual purposes included: career preparation, college preparation, practical life skills, agricultural literacy, and individualization. These purposes influenced the type of experiences teachers sought out to develop new knowledge and how they transferred that knowledge in the classroom. These findings support further examination of what is shaping agriculture teachers' PCK.

Introduction

Teacher education in agriculture has acknowledged the importance of pedagogical content knowledge (PCK) as a knowledge base for quality teachers and its positive impact on teaching and learning (Knobloch, 2002; Roberts & Kitchel, 2010). PCK influences numerous teaching decisions related to student understanding of content such as selecting appropriate representations and examples of concepts, addressing student misconceptions of specific concepts, and integrating and sequencing ideas and concepts in the curriculum (Ball et al., 2008). Therefore, it is imperative teacher education in agriculture assists agriculture teachers in developing PCK. However, due to limited research in agricultural education, it is still unclear what PCK teachers possess, to what degree they possess it, and the influence it has on teaching.

At this point, the agricultural education field does not have a conceptualization of PCK for any topic area. Therefore, it is critical to first examine experienced teachers who have PCK. Since PCK is topic specific (Etkina 2010; Hashweh, 2005; Van Driel & Berry 2012), it will also be important to examine PCK for specific agricultural education topics. This study will focus on the investigation of agriculture teachers' PCK related to the plant sciences. Creating a picture of experienced teachers' PCK could provide valuable information for teacher preparation programs and inservice professional development initiatives. This could help to insure the quality of agriculture teachers in the classroom and ultimately enhance student learning.

Review of Literature

The definition of PCK has evolved over time; with the majority of researchers in agreement that PCK is more complex than Shulman originally conceived (Kind, 2009). The most recent definition of PCK came from a summit where current minds in science PCK research attempted to create a consensus definition. PCK was defined as the knowledge of, rationale behind, planning for, and act of teaching a piece of subject matter using specific methods for specific students to promote student learning (Gess-Newsome & Carlson, 2014). This definition of PCK highlighted its presence in both the planning stage of teaching and the in-the-moment action of teaching.

Today, PCK is widely accepted as a crucial knowledge base for teachers (Loughran, Mulhall, & Berry 2004); however, its specific components and how they interact together still varies amongst researchers (Ballantyne & Packer, 2004; Hashweh, 2005). In mathematics education research, PCK is commonly referred to as

mathematical knowledge for teaching and components include: knowledge of content combined with knowledge of students, knowledge of content combined with knowledge of teaching methods, and knowledge of content combined with knowledge of curriculum (Hill, Ball, & Schilling, 2008). In science education, similar components include: knowledge of science curricula, knowledge of assessment of scientific literacy, knowledge of instructional strategies, and knowledge of students' understanding of science (Magnusson, Krajcik, & Borko, 1999). Based on a review of PCK literature, instruction, students, curriculum, and assessment knowledge within a subject matter context repeatedly appear as important components of the PCK in various education disciplines (Kind, 2009). However, discrepancies amongst developed models may lead to difficulties when examining PCK in largely non-researched education disciplines.

In addition to the debate between various components of PCK, another aspect of PCK research inquiries have dealt with the topic specific nature of PCK. Early research studies investigated PCK in a more generalized fashion by discipline; however, various researchers have now claimed PCK is topic specific (Etkina, 2010; Gess-Newsome & Carlson, 2014; Magnusson et al., 1999; Van Driel & Berry, 2012). In science education, a recent study examined the topic specific nature of teaching electrochemical cells and nuclear reactions (Aydin, Friedrichsen, Boz, & Hanuscin, 2014). When comparing chemistry teachers, the researchers discovered teachers' knowledge of instructional strategies, learners, and curriculum were topic specific, but other areas such as knowledge of assessment and orientations were not topic specific. It is still unclear if PCK is topic specific in general or if it differs by components of PCK (Aydin et al., 2014).

Van Driel and Berry (2012) further described PCK as topic, person, and situation specific. The PCK definition and model from the recent summit of science educators also reflects the personal and topic specific nature of PCK, by including components such as beliefs, orientations, and personal PCK (Gess-Newsome & Carlson, 2014). Knowledge, beliefs, and experiences of individual teachers can shape their PCK (Van Dijk & Kattmann, 2007). PCK is constructed through an individual teacher's lens, and is described as idiosyncratic by Lee (2011) and Loughran et al. (2012). No one teacher will have the exact same PCK for a topic; however, there can be overlaps and similarities (Padilla & Van Driel, 2011). Friedrichsen, Van Driel, and Abell (2010) call for further exploration into the role of science teaching orientations on PCK. They proposed goals and purposes of science teaching, views of science, and beliefs should be specifically examined (Friedrichsen et al., 2010).

Purpose of Study

The purpose of this grounded theory study was to conceptualize PCK for a specific topic in agriculture to serve as a model for the investigation and conceptualization of additional topics. The following central research question guided the study: What is experienced agriculture teachers' PCK related to the plant sciences?

Methods

The emergent design of grounded theory was chosen as the approach for this study because of the exploratory nature of the research question. Agricultural education research in PCK has been limited and the field does not have a conceptualization of PCK for any topic area within agriculture. Generating a theory in one particular subject area, plant sciences, can serve as the foundation for future PCK research in agricultural education. PCK is the knowledge teachers use as they plan for and go through the teaching process (Kind, 2009) and investigating a concept associated with a process is a defining tenant of grounded theory methodology (Corbin & Strauss, 2008). Specifically, this study was guided by the work of Corbin and Strauss (2008), who view grounded theory as a way to understand complex social situations and experiences.

This study was approached from a pragmatic lens. The epistemological roots of grounded theory rest in pragmatism and interactionism (Strubing, 2007), making this lens appropriate for the methodology. The purpose of grounded theory is to generate theory from data and data are treated as reality under construction (Strubing,

2007). Key assumptions of grounded theory, according to Corbin and Strauss (2008), such as the importance of actions and interactions in developing meaning, have roots in early pragmatist philosophers John Dewey and George Mead. Pragmatists view reality as something that cannot be separated from the researcher because reality exists as experienced through people. The actor and the environment determine each other and truth is what is known at the time but is subject to change (Corbin & Strauss, 2008).

Participants

Participants in this study included eight high school agriculture teachers in the state of Missouri with a minimum of eight years teaching experience. This specific experience range was chosen based on literature stating expertise begins to be achieved for teachers after they have spent approximately five to eight years in the field (Darling-Hammond & Bransford, 2005). Experienced teachers were specifically chosen to increase the likelihood they would possess PCK. Recommendations from teacher educators regarding teachers' quality and possession of PCK in the plant sciences were used in the purposeful selection of teachers to participate in this study. All recommended experienced teachers had professional development experiences in plant science and a reputation as an effective teacher by their peers and teacher educators. Additionally all participants were located within a 120 mile radius of the university so field work could be conducted.

Data Sources and Collection

Teachers can demonstrate PCK in different settings. At a recent PCK summit, a consensual PCK definition developed by science education researchers included two distinct parts which revealed PCK's emergence in both the planning and in-the-moment phases of teaching (Gess-Newsome & Carlson, 2014). Additionally, reflection is a key piece of PCK development (Schneider & Plasman, 2011; Van Driel & Berry, 2012), with the summit definition identifying knowledge, reasoning, and planning as explicit reflection *on* action and the act of teaching as explicit or tactic reflection *in* action (Gess-Newsome & Carlson, 2014). Hashweh (2005) asserted experienced teachers develop PCK as a result of planning, teaching, and reflecting on teaching. To adequately capture agriculture teachers' PCK in plant sciences, it became important to explore data sources spanning those various settings in which PCK occurs.

Six sources of qualitative data were collected for this study including: pre-observation interviews, classroom teaching observations, field notes, lesson artifacts, teacher journal reflections, and post-observation interviews with stimulated recall. Each data source occurred during one of the three settings above and provided a unique contribution in creating a complete picture of agriculture teachers' PCK. A multi-method approach is best when investigating PCK (Kapyla et al., 2009; Loughran et al., 2004). A review of mathematics PCK literature revealed when PCK was examined within a specific context, classroom observations supplemented with interviews, artifacts, and reflections were most typically used as data sources (Depaepe et al., 2013). Using various data sources served to capture as much data as possible in the short time frame of a single unit to achieve saturation of the data (Creswell, 2013). Data were collected fall 2014 over the course of a single plant science unit for each participant in the study (Figure 1). Plant science was chosen because it is a commonly taught area in Missouri schools, there were ample experienced agriculture teachers in plant science, and I, the researcher, had familiarity with the content area in order to recognize and study PCK.

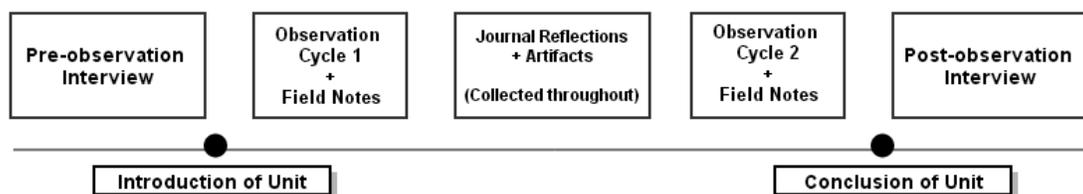


Figure 1. Data Collection Timeline

Data Analysis and Changes to Central Question

Collection and analysis were conducted simultaneously due to the nature of grounded theory methodology (Corbin & Strauss, 2008). All six data sources were used in data analysis. Data were analyzed using a constant comparative process where data is compared against data, beginning with the first piece of data collected to search for similarities and differences (Corbin & Strauss, 2008). All interviews were transcribed verbatim. I followed the three step coding process of open, axial, and selective coding (Corbin & Strauss, 2008). The purpose of open coding is to develop categories, the purpose of axial coding is to connect categories, and the purpose of selective coding is to create a story ending in a developed theory (Corbin & Strauss, 2008).

To begin the open coding process, I examined all data sources as they became available for initial codes and adapted my data collection and analysis based on information needed to saturate a particular idea (Creswell, 2013). Various analytical techniques as described by Corbin and Strauss (2008) were used throughout the data analysis process including: the use of questioning, making comparisons, drawing upon personal experiences, and examining language. Once an initial set of categories had been developed, I identified a pervasive phenomenon to focus on for this study that served as the central piece of my theory (Creswell, 2013).

It became apparent after the first three interviews that plant sciences was not specific enough of a topic to be able to adequately describe the participants' PCK in a way that allowed for comparisons between participants and ultimately the development of a theory. While all of the participants taught a plant science unit, the actual topics that they covered within that unit varied. Simultaneously with this realization, a different phenomenon began to surface. Beginning with the first pre-observation interviews, the participants discussed their beliefs regarding agricultural education. This was particularly interesting because my questions regarding orientations were purposefully left for the post-observation interviews. When I open coded the first participant interview, I also noticed this emerging theme of beliefs that seemed to shape teacher knowledge. In grounded theory a wide net is cast in the form of a research question to see what truly emerges from the data (Creswell, 2013). Sometimes once the central phenomenon emerges it makes sense to alter the research question to reflect the new direction of the study. My original research question was: What is experienced agriculture teachers' PCK related to the plant sciences? Upon emergence of the central phenomenon the new central research question to guide the study became: What shapes experienced agricultural teachers PCK in the plant sciences? Using this question as my guide, I recoded existing data and applied the new research question to all subsequent data collected and analyzed.

The next step in the coding process was axial coding. Utilizing my central phenomenon as a guide, I continued to analyze the data using the strategies mentioned above. Corbin and Strauss (2008) describe open coding as breaking the data apart and axial coding as bringing the data back together in a new way. I analyzed the data for context, conditions, and consequences (Corbin & Strauss, 2008); to better understand the central phenomenon and how the categories interrelated. This process helped me to see how beliefs shaped the PCK of my participants. Memos were kept throughout the entire process and reflected upon during data collection and analysis. Memos were used not to simply record information but also to analyze information, making memos a crucial part of the data analysis process (Corbin & Strauss, 2008).

Validation Strategies

Throughout the study I engaged in various validation strategies described by Creswell (2013) for general qualitative work. I utilized six separate sources of data to provide detailed evidence of the phenomenon being investigated. Triangulation was achieved by using various data sources to corroborate evidence and validate the study (Creswell, 2013). Rich, thick description was used to explain the findings from this study to aid the reader in both understanding how the theory was developed and to aid in transferability (Creswell, 2013). Memoing was utilized throughout the entire research process as a way to ask questions of the data, develop connections between concepts, and document my thoughts (Corbin & Strauss, 2008). I also engaged in reflexivity by

examining my own position within the data and how my position was shaping data analysis (Creswell, 2013). Finally, in order to confirm the credibility of the findings, I engaged in member checking of findings and interpretations (Creswell, 2013).

Findings

The major theme shaping the PCK of experienced agriculture teachers in the plant sciences was integrated belief systems. Integrated belief systems were comprised of three main components: beliefs about the purpose of agricultural education, beliefs about plant science education, and beliefs about teaching and learning in agricultural education. These three components interacted to form the participants' integrated belief systems (see Figure 2). For the purposes of this paper, the beliefs about the purpose of agricultural education will be the focus.

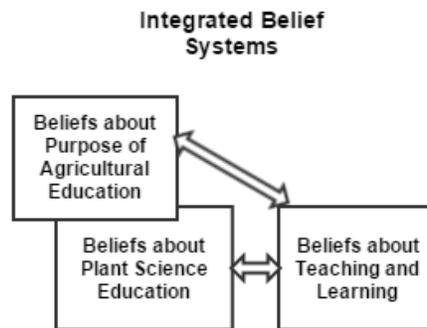


Figure 2. Integrated belief systems of experienced agriculture teachers

Beliefs about Purpose of Agricultural Education

Integrated belief systems emerged as the driving force shaping experienced agriculture teachers' PCK, but specifically, participants' beliefs regarding the purpose of agricultural education emerged as the key belief system. After some contemplation and discussion with participants, it began to emerge that their individual beliefs regarding the purpose of agricultural education in general (not plant science specific) seemed to directly influence their other beliefs within the integrated belief systems. The participants' specific beliefs about plant science education and beliefs about teaching and learning mirrored their overall belief about the purpose of agricultural education. For this reason, the beliefs about the purpose of agricultural education category was the most emergent and dominant category.

The four main purposes of agricultural education that emerged from the data were: career preparation, college preparation, agricultural literacy, and practical life skills. The majority of participants in the study held multiple views about the purpose of agricultural education for their students, but some expressed more of an emphasis on specific views than others. A fifth view labeled individualization, based on individual student need, was surfaced by one participant as the purpose of agricultural education as he attempted to combine all of the purposes to best meet the needs of his various students and classes as a whole.

Many participants viewed the purpose of agricultural education to be career preparation and skills development. Cora, however, was the only participant in the study with career preparation as her sole primary view. "My goal is to teach kids to be successful when they leave here so they could go to work in a greenhouse or they could raise their own plants." Due to the uniqueness of career preparation as her sole primary view, I asked Cora if she thought other agriculture teachers were operating under similar beliefs. Her response was, "Unfortunately, not enough. I truly believe that we need to teach kids by doing."

If the participants did not hold a career preparatory view it was most often because it didn't fit their audience (students). To explain why she didn't have career preparation as one of her views, Jane stated, "But a lot of our students, you know, they're in our programs not to learn career preparation, but they are in it for everything else." Later in the interview, Jane clarified that the majority of students in her greenhouse class had taken agriculture leadership courses previously and enrolled in greenhouse to avoid an agriculture mechanics class. Ashley described the limited number of students in her program that pursued a career in the greenhouse industry in her 18 years in the field. "Right now I have one current student with a greenhouse and two former students with greenhouses. The rest of them don't, so right now it's not really applicable."

A second view participants held about the purpose of agricultural education was the college preparation of their students. This view included both specific content knowledge they wanted their students to acquire in plant science (or another agriculture subject area) in preparation for college, and general college readiness skills such as note taking, synthesizing information, and critical thinking. Jane explicitly explained to her students how the content she taught in her classroom will prepare them for college. "Things you hear in my classroom you're going to see on college entrance exams. It's my job to go over the most stuff I can; it's preparation for those other tests and courses they are going to be taking." Dawn described how career and college preparation overlap in her secondary views about the purpose of agricultural education, "Well some of the kids, like one in particular, he wants to go into turf grass. He's a big baseball player. So, if they can grasp concepts now. They're employable in college. It's easier for them in college."

The similarity between college and career preparation views on the purpose of agricultural education was they both focused on an ultimate career outcome for students. This included careers in the plant science industry directly out of high school, returning to traditional production farms and raising crops for livestock, employability in college in the plant sciences industry to earn money and gain experience, or preparation for a college degree in agriculture or another field. Most of the participants who held a college preparation view also held a career preparation view about the purpose of agricultural education.

Every participant, even the individuals who held career and/or college preparation as their primary views, discussed agricultural literacy as a purpose of agricultural education in some capacity. The difference between the participants was how much of an emphasis they placed on agricultural literacy. Allison, who incorporated skills and science in her classroom, said this to her students about agricultural literacy during a classroom observation, "...we are going to talk about the technical aspects, but you also have to be able to answer the how and they why. I want you to be a good consumer." This quote illustrated how even with a focus on other purposes of agricultural education, agricultural literacy was still important to Allison.

When I asked Jane what the purpose of agricultural education was, her immediate response was, "its literacy. It's literacy." Jane discussed literacy throughout both of her interviews and multiple journal reflections. She stated, "I feel like that's my job, I was put into the position that I am in now, for ag literacy purposes." The experiences that shaped Jane's agricultural literacy view stemmed partially from the characteristics of students involved in her agriculture program. She said, "A lot of it would be ag literacy because the kids are just getting much farther removed from the farming operation. So, they're starting to not see the relevance of it anymore like I got to see growing up." Clint also discussed how his students took information back to their parents, grandparents, and other members of his local community.

Even Cora, who had a heavy career preparation focus to her program, saw the value of an agricultural literacy purpose for agricultural education. She said, "As a consumer or as a grower they are going to need to understand those principles." Some of the participants even second guessed their agricultural literacy focus. After describing her agricultural literacy and practical life skills related views Kelly said, "Maybe that's the wrong way to think about it." It is possible agriculture teachers feel guilty for not pushing agriculture professions or specific career skills when they adopt a more general agricultural literacy purpose. Overall,

agricultural literacy was the only purpose of agricultural education mentioned by all participants in some capacity.

The fourth view held by participants about the purpose of agricultural education was practical life skills. This view shared similarities with agricultural literacy (development of general knowledge and awareness about agriculture); but the life skills view took it a step further than mere literacy to focus on students' developing tangible skills such as being able to grow a garden, create a weld, or operate a chainsaw. Some participants even mentioned some soft skills as practical life skills such as being able to conduct a meeting or communicate to a group of individuals. Originally, the practical life skills view was included within agricultural literacy, but upon further reflection it became apparent there were distinct differences between the purposes.

The practical life skills Kelly described in her classroom went beyond plant science content, even within her plant science classes. As a component of her floral industry unit, she had the students complete a wedding project. When we discussed her purpose of this particular assignment Kelly indicated that in addition to skills related to the floral industry, she was also assisting students in developing basic math skills and communication skills. Cora also discussed the importance of practical life skills in the form of soft skills. "Maybe they're not learning plant science, but they're learning life skills. Citizenship, cooperation, they're learning so many skills that will make them productive citizens because of what I have taught them." Soft skills were not explicitly mentioned as a purpose of agricultural education by participants, but evidence of soft skill development occurred in the majority of the classrooms I observed.

Practical life skills and agricultural literacy are overlapping views because they both focus on knowledge and awareness about agriculture. However, practical life skills could be regarded as an application or an additional step beyond agricultural literacy, just like college preparation could be regarded as an additional step beyond career preparation. For this study, if a participant viewed the purpose of agricultural education as practical life skills they also viewed the purpose as agricultural literacy. However, there were participants who held an agricultural literacy view but not a general practical life skills view as their purpose.

While all of the views about the purpose of agricultural education mentioned previously were rooted in what the participants thought their students needed, one participant took it a step further. Clint developed a new view, which encompassed all four of the different views mentioned previously. Clint and I described this combined purpose as individualization, because it focused on meeting the needs of each individual student. Clint felt an obligation to teach to each student individually. He summed up his belief with this comment, "Could I say well 51% of my students are going to benefit from a scientific based agricultural curriculum so we're going to do it. So I just leave out 49% of my students? I'm not doing that." Clint's individualization view overlapped with all of the other views regarding the purpose of agricultural education including: career preparation, college preparation, agricultural literacy, and practical life skills. Career preparation and college preparation views commonly overlapped and agricultural literacy and practical life skills views commonly overlapped. Figure 3 illustrated the overlapping beliefs about the purpose of agricultural education for the participants in this study.

Overlapping Beliefs about the Purpose of Agricultural Education

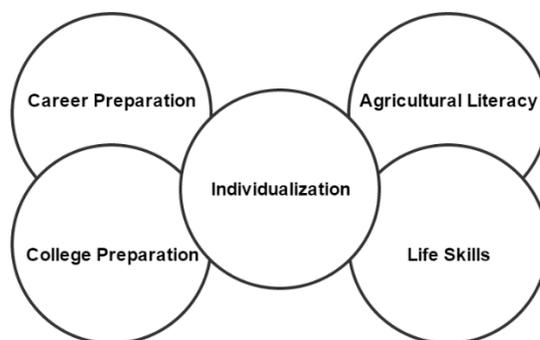


Figure 3. Overlapping Beliefs about the Purpose of Agricultural Education

Beliefs about Purpose of Agricultural Education and its Connection with Teachers' PCK

Participants with career preparation as their primary view developed PCK that included more manual skill outcomes such as: dividing plants, greenhouse maintenance, treating plant diseases, greenhouse sales, and greenhouse management so they could develop those skills within their students. Participants with a career preparation view also gained knowledge more often related to authentic assessments because they wanted the students to physically show them they had mastered a skill versus memorization of information. Allison and Cora, who both had career preparation as a primary view for the purpose of agricultural education, groomed students to be greenhouse managers. Thus, they utilized more inquiry based teaching methods and engaged students in thinking about potential issues from a business perspective. Cora's career preparation view influenced how and what content she chose. In particular, she expressed to me that if she doesn't use the knowledge herself in the greenhouse she doesn't teach it to students.

Viewing career preparation as the purpose of agricultural education also influenced some of the experiences the participants engaged in for their content and PCK development, including seeking knowledge and assistance from other agriculture teachers in the field. The participants with a career preparatory view all had a heavy incorporation of the greenhouse into their classroom, which increased the participants' need to attend professional to learn practical manual greenhouse operation skills. Cora commented teacher preparation did not prepare her to operate a greenhouse and this terrified her when she first began her teaching career. She expressed professional development workshops and classes and talking with professionals were her primary sources of PCK because of her lack of background knowledge.

Participants' with the career preparation view stressed hands-on learning and skill development. One of the biggest complaints about a popular curriculum source, was it did not include enough activities or hands-on applications. All of the participants in the study were familiar with a Missouri agriculture curriculum and incorporated that curriculum into their classrooms to some degree. This curriculum included the content information, study questions and objectives, and instructor and student workbooks, but it did not include many activities to reinforce the content. If participants' viewed the purpose of agricultural education as a career preparation that necessitated hands-on application and skill development, they would most likely need more than the Missouri curriculum alone to achieve this purpose.

In contrast, participants with a primary agricultural literacy view were more likely to focus on developing knowledge and less likely to focus on developing skills. This altered the type of assignments given to the students and the teaching methods utilized to deliver material. Agricultural literacy focused participants tended to utilize classroom discussion, reading, and writing assignments more heavily than participants whose views were focused on other purposes of agricultural education. Jane illustrated how her primary view of agricultural

literacy influenced her classroom assignments. “They are the future consumers of our food; do they understand why that is important? And so we do writing assignments to make sure they understand it and we do a lot of discussion.” The agricultural literacy view also influenced the type of content the participants deemed important to teach, and subsequently the knowledge they developed on how to best teach that content. Dawn summed up how she chose the content she covered in her classroom, “If the students can’t use it in the future, what’s the point?” This illustrated a direct connection between her views about the purposes of agricultural education, the content she felt was more important to learn about, and the subsequent PCK she developed.

Clint stood out from the rest of the participants by having a student individualization view as his purpose of agricultural education. He discussed the responsibility he felt to take each student as far as they could go, which caused him to have to know the content he was teaching “pretty dang well.” This view influenced Clint to seek out various knowledge and teaching strategies to fit with the needs and interests of all his students. He commented that he needed to teach the same agriculture content on different levels depending on the abilities of his students and for different purposes depending on the end goals of his students after high school.

Discussion

In previous research, particularly in the field of science education, the concept of orientations is primarily utilized to describe what is shaping teachers’ PCK. Magnusson et al. (1999) discussed nine orientations for science teachers and included these orientations to teaching as shaping all of the other components of PCK in their model. Many researchers have adopted their definition of orientations (Aydin et al. 2014; Friedrichsen & Dana, 2005; Kapyła et al., 2009; Lee, 2011; Padilla & Van Driel, 2011; among others). However, there are many issues surrounding the concept of orientations surfaced by Friedrichsen et al. (2010) including: various definitions and meanings behind the word orientations, weak or non-existent relationships between orientations and the rest of the PCK model, researchers simply assigning teacher orientations, and researchers simply not addressing this proposed component of PCK. Prior to Magnusson et al. (1999), other researchers such as Grossman (1990) described orientations as concepts of purposes for teaching subjects that included knowledge and beliefs. The concept of beliefs first postulated by Grossman (1990) more closely fits the belief systems theme that emerged from this study. Other researchers have explored shapers of PCK that were not limited to orientations, including beliefs and epistemologies or included beliefs in their model of PCK (Garritz, 2009; Gess-Newsome & Carlson, 2014; Hashweh, 2005; Luft & Roehrig, 2007).

Beyond simply identifying the beliefs of the participants, I explored the influence of these beliefs on the participants’ PCK. Friedrichsen et al. (2010) discussed that there were often weak or nonexistent connections between orientations and PCK in the literature. By focusing on what shaped PCK, I was able to tease out specific beliefs and look at the impact of context and experiences on those beliefs. Often, the concept of beliefs or orientations is described in a vacuum without describing in what ways it influenced participants’ PCK. If PCK is truly person specific (Van Driel & Berry, 2012), then it makes sense that the individual belief systems of a person would have a key role in shaping their PCK. In fact, Veal (2004) postulated that to develop PCK sometimes our beliefs about education have to change. These various beliefs led to different types of PCK development in participants and different approaches in the classroom. One of the most emergent beliefs in this study was the purpose of agricultural education. The debate over the purpose of agricultural education is not new (National Academy of Sciences, 1988; Roberts & Ball, 2009), and many of the participants described changing their purposes over time. However, instead of simply labeling participants as agricultural literacy focused or career preparatory skills focused, I explored the purposes of agricultural education more in-depth. The participants in this study held multiple views for the purpose of agricultural education that often complimented one another.

Beliefs about the purpose of agricultural education influenced the following in the participants: how much they knew, how much they felt they needed to know, what they decided to teach, and how they decided to teach it. Beliefs emerged as one of the most influential components shaping the participants’ PCK. However, it is

uncertain if holding multiple views about the purpose of agricultural education creates well-rounded teachers who can reach a variety of students, or if it limits the PCK development of a teacher because their purposes are split across multiple views. Future agricultural education research should further explore the impact of multiple views about the purpose of agriculture education on PCK development, specifically examining beginning teachers who are still in the early stages of PCK development (Schneider & Plasman, 2011).

All of the participants believed that agricultural literacy was a purpose of agricultural education, either as primary or secondary view. This finding is similar to a previous study of preservice agriculture teachers where all of the participants expressed that their primary goal of agricultural education when they entered the classroom was agricultural literacy (Rice & Kitchel, 2013). This suggests that this view begins at least at the preservice level, if not earlier, which is consistent with a study from Kapyla et al. (2009) that found student teachers' orientations to teaching were connected to their backgrounds in education. Agricultural literacy, for many participants, was described as a responsibility. Some of the participants discussed that they taught with an agricultural literacy purpose more often in introductory level classes. This could be because teachers see literacy as a foundation for agricultural education. With more and more students entering agricultural education classes without agriculture backgrounds (National FFA, 2015); the need to begin at a basic level with agricultural education may be increasing in importance. If agriculture teachers have to begin at the literacy level to meet their students where they are currently at, in terms of knowledge, we may not be able to expect students to gain knowledge beyond agricultural literacy within the typical four years of an agriculture program. Many of the teachers expressed they taught agricultural literacy because it fit their student audience and their needs after high school. Jane said it was rare for her students to get a degree in agriculture, so she focused on literacy. However, are her students not pursuing agriculture degrees *because* she is teaching literacy over skills or is it simply *why* she is teaching literacy over skills?

Another concern about an agricultural literacy focus is that the content may be too shallow. When asked for their definitions of agricultural literacy, participants used words such as basic knowledge of agriculture, informed consumers, and voters. Similarly, the National Council for Agricultural Education (2009) described agricultural literacy as a vision for agricultural education that included all people valuing and understanding agriculture. This raises the question, how much do teachers actually need to know (both content knowledge and PCK) to teach with an agricultural literacy focus? There are more opportunities to pursue science-related careers in agriculture than ever before with 74% of agriculture jobs expected in the science and business sectors by the end 2015 (United States Department of Agriculture, 2015). If part of the need for literacy is to appeal to current student needs, it may be beneficial for agriculture programs to focus more on science integration or science related careers.

Participants that believed the purpose of agricultural education was career preparation or practical life skills, and subsequently felt the need to teach students specific skills, developed PCK that included knowing how to actually perform those skills themselves and how to break those skills down for student understanding. This required very different preparation and knowledge development than participants who held other views about the purpose of agricultural education. Dawn commented that most teachers do not have the greenhouse operation skills upon graduation and have to seek out additional knowledge. Cora discussed when teaching students psychomotor skills it is more difficult to "fake it". This phenomenon could be similar to other career and technical education areas or other disciplines such as music education. Music education teachers would presumably need more than a rudimentary knowledge of instruments in order to instruct students how to play instruments. PCK research in music education has established the need for skill development in preservice teachers (Ballantyne & Packer, 2004; Haston & Leon-Guerro, 2008). Specifically, Haston and Leon-Guerrero (2008) found the instrumental training history prior to admittance into the teacher preparation program was a factor in the PCK of music teachers. Examining various teachers who engage in teaching students psychomotor skills may uncover valuable information about the nature of PCK.

While skill development and hands-on education was described by many as a hallmark of agricultural education and was substantiated by the literature (Talbert et al., 2005), there may be issues with teachers focusing solely on skill development in the classroom. Some agriculture content areas, like agricultural economics, would be difficult to teach through a psychomotor skill based view of agricultural education. Because of the wide array of content that can be taught in agricultural education, it may be possible that a single primary view about the purpose of agricultural education is not appropriate for all agriculture content areas. The individualization view, surfaced by Clint, attempted to combine all of the purposes of agricultural education. This view may have benefits for students, but this purpose may not be practical for teachers. It is extremely difficult for any teacher to meet the needs of all of their students all of the time. Split focuses on college preparation, career preparation, practical life skills, agricultural literacy, and the all-encompassing individualization belief has the potential to alter instruction in teacher preparation programs. It is unknown if agricultural education teacher preparation programs are preparing future teachers for these vastly different approaches. And because these beliefs shape much of teachers' PCK development, it is recommended teacher preparation programs guide teachers in considering these beliefs in both their preservice and inservice careers. PCK development takes time and continues to be developed with experience in the field inservice (Baxter & Lederman, 1999; Clermont et al., 2006; Hashweh, 2005; Kind, 2009; Lee et al., 2011; and Van Driel et al., 2002). It is also possible that explicitly addressing PCK and what shapes this knowledge base at the preservice level in some ways is beyond the developmental readiness of the students (Kapyla et al., 2009), and instead should be implicitly embedded throughout the curriculum.

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Using Epistemological Positions and Orientations to Instruction to Explore School-Based, Agricultural Educators Perceptual Identities: A Q-Sort Study

Abstract

Mounting empirical evidence suggests the conflation of teachers' instructional orientations and personal epistemological beliefs helps form the perceptual identity of educators. The current study, therefore, sought to describe in what way Oklahoma agricultural education teacher's epistemological beliefs and orientations toward instruction combine to form the dominant perceptual identities of school-based, agricultural education (SBAE) instructors. To accomplish this, a Q methodological approach was employed. Findings revealed three key perceptual identities of SBAE instructors: Diligent Educator, Daring Educator, and Devoted Educator. All three of perceptual identities stressed the importance of experiential learning. However, each position differed in how they believed experiential learning should be delivered to students. For example, Diligent Educators believed learning involves a well-designed educational process that stresses hard work. Devoted Educators, however, placed emphasis on nurturing students during the learning process. Meanwhile, Daring Educators contend that knowledge is more fluid and self-constructed. Using Perry's epistemological development scheme and Bowden's conception of phenomenographic pedagogy, recommendations for praxis are offered for each perceptual identity.

Introduction

Why do educators choose to incorporate some instructional methods but ignore others? How can select educational techniques ignite a deep passion in teachers while others leave them feeling frustrated and underwhelmed? Mounting evidence (Braten & Stromso, 2005; Roth & Weinstock, 2013; Wadsworth, 2007) aimed at answering these questions points to a link between teachers' instructional orientations and their personal epistemological beliefs.

Personal epistemological beliefs, also known as nontranscendental epistemologies, are concerned with how knowing is situated in our daily lives (Perry, 1970; Schommer, 1990; Thayer-Bacon, 2003). Perry (1970) first explored this phenomenon through an investigation that traced the epistemological positioning of 700 male undergraduates from Radcliff and Harvard. Perry's (1970) work yielded an elaborate scheme of how the students progressed through four primary epistemological positions: (a) dualism, (b) multiplism, (c) relativism, and (d) relativism commitment. Today, most epistemological-based research stems from Perry's (1970) seminal work (Belenky, Clinchy, Golderberger, & Tarule, 1986; Bendixen, Schraw, & Dunkle, 1998; Brownlee, Purdie, & Boulton-Lewis, 2001; Schommer, 1990, 1993).

Contemporary epistemological evidence on the personal epistemology construct is well situated in the literature in regard to understanding its influences on student outcomes (Brownlee et al., 2001; Schaw, Bendexen & Dunkle, 2002; Schommer, 1990, 1993). The literature demonstrates that epistemological beliefs can influence students' motivation, moral development, critical thinking, decision-making, as well as, a number of key learning outcomes (Hyytinen, Holma, Toom, Shavelson, & Lindblom-Ylänne, 2014; Peng & Fitzgerald, 2006; Pintrich & Garcia, 1994; Schommer, 1993, Yang, 2005). Therefore, the lens students use to view the nature of knowledge can influence their educational outcomes (Braten & Stromso, 2005; Schraw et al., 2002; Schommer, 2004). However, conflicting evidence exists regarding the influence that teacher candidates personal epistemological positions have on the educational experiences they intend to provide their students (Braten & Stromso, 2005; Fives & Buehl, 2008; Kagan, 1992; Pajares, 1992; Roth & Weinstock, 2013; Tschannen-Moran, Woolfolk-Hoy, Davis, & Pape, 1998; Wadsworth, 2007). For instance, Roberts, Baker, and Goossen (2015) found that pre-service agricultural education students aligned congruently with Perry's (1970) scheme when asked to describe beliefs about the nature of knowledge. However, a chasm emerged when the pre-service agricultural education teachers began contextualizing those beliefs in relation to how they planned to

operationalize them as agricultural education teachers (Roberts et. al., 2015).

Despite the messiness of this construct, some scholars strongly maintain the position that teacher's beliefs do indeed presage action, as well as, performance outcomes across learning contexts (Braten & Stromso, 2005; Fives & Buehl, 2008). For example, successful teachers hold more traits and skills than basic content knowledge (Fives & Buehl, 2008; Woolfolk-Hoy et al., 2006). Effective teachers understand and use various strategies, theories, and processes in appropriate contexts so that their students can have powerful learning experiences (Buehl & Fives, 2008). These deeply interwoven skills might be more implicit than explicit; nevertheless, they remain essential to effective instruction (Wadsworth, 2007).

The school-based, agricultural education (SBAE) field necessitates that instructors not only teach class at high level, but also advise students through their FFA and SAE experiences (Baker, Robinson, Kolb, 2012). As a result, agricultural educators must take on an array of job duties (Delnero & Montgomery, 2001; Robinson, Krysher, Haynes, & Edwards, 2010). Torres, Ulmer, and Aschenbrener (2008) explained that because of the various instructional challenges agricultural educators face across contexts it is important to understand how these challenges blend to influence their self-perceptions. As a result, a need exists to attain a more intimate understanding of SBAE instructors' instructional orientations (Jenkins III et al., 2010; Roberts & Dyer, 2004; Torres et al., 2008), and epistemological positions (Roberts et al., 2015) that influence their instructional roles.

Statement of the Problem, Purpose, and Research Question

The literature demonstrates that teachers often conflate epistemological beliefs, instructional training, and societal expectations of effective instruction to construct a single perceptual identity (Korthagen & Kessels, 1999). To understand how SBAE instructors perceptual identities are formed, it is important to understand how subjective variables such as epistemological beliefs and teachers' orientations toward instruction combine conceptually. The current study, therefore, sought to describe in what way Oklahoma SBAE instructors' epistemological beliefs and orientations toward instruction combine to form their dominant perceptual identities. This study aligns with Priority 4 of the National Research Agenda, which stresses "meaningful, engaged learning in all environments" (Doefert, 2011, p. 9). Therefore, the following research question guided the investigation: *How do SBAE instructors' epistemological beliefs and orientations to instruction combine to form their perceptual identities*

Theoretical Framework

To accomplish study's purpose, we used two theoretical frameworks to ground this investigation: Perry's (1970) epistemological development scheme and Bowden's (1990) conception of phenomenographic pedagogy. Each will be discussed independently, followed by a description of the importance of integrating these theories for this investigation.

Epistemological Beliefs

Perry (1970) developed a scheme for classifying epistemological development through four major positions: (a) dualism, (b) multiplism, (c) relativism and (d) commitment. The four positions are not considered fixed, but rather on a continuum of progression.

Individuals operating in the dualism position believe that knowledge is absolute (Perry, 1970). As such, knowledge and information should be delivered through an authority figure (Perry, 1970). In the second phase, multiplism, individuals believe that knowledge is uncertain not composed of facts and opinions (Perry, 1970). As individuals enter a relativism position they undergo considerable growth in terms of epistemological

sophistication (Perry, 1970). In relativism, individuals begin to believe that knowledge is nested contextually and individually constructed. Therefore, knowledge is relative to an individual's interpretation of their experience (Perry, 1970). A key feature of relativistic thinking is that knowledge is a direct result of the work put forth by the individual (Perry, 1970). As individuals move into the most complex position, relativism commitment, relativistic thinking remains a key feature (Perry, 1970). However, fluidity among truths exists in which the individual begins to value select beliefs over others (Perry, 1970).

Phenomenographic Pedagogy

The use of appropriate educational practices and conceptions of learning underpin phenomenographic pedagogy (Trigwell, Prosser, & Ginns, 2005). Bowden (1990) explained,

In a sense phenomenographic research mirrors what good teachers do. It tries to understand what the students are doing in their learning. It attempts to discover what different approaches students are taking and to understand these in terms of outcomes of their learning activities. Good teachers do that as a preliminary to further action to help their students come to understand the concept concerned and, of course, many do it instinctively. (Bowden, 1990, p. 9)

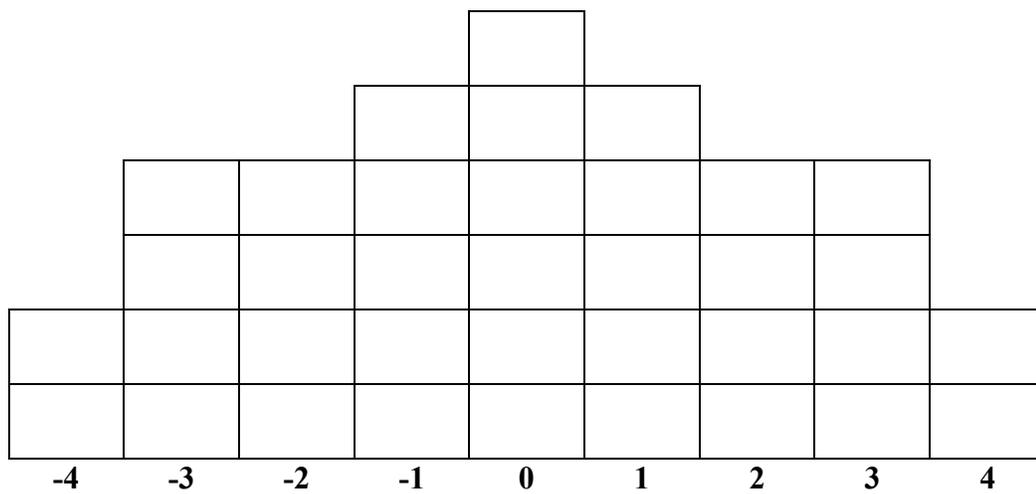
A key assumption of phenomenographic pedagogy is the notion that more complete approaches to teaching and learning exist (Bowden, 1990). This awareness predicates teachers' ability to facilitate *conceptual change learning* for their students (Bowden, 1990). Conceptual change learning is an advanced pedagogy in which students are challenged to problem solve, learn experientially, and develop key learning assumptions and conclusions themselves (Bowden, 1990; Trigwell et al., 2005). As such, this approach involves educators moving from teacher-centered approaches where knowledge is handed down to their students to more student-centered approaches. The theory involves many teaching and learning methods, however, it conceptualizes each on a continuum between teacher and student centered (Trigwell et al., 2005).

Because each theory considered beliefs and practices in a manor of shifting progression, the integration of Perry's (1970) epistemological development scheme and Bowden's (1990) conception of phenomenographic pedagogy provided the necessary framework to analyze the perceptual identities of educators. We, therefore, were emboldened to seek out the diverse and ranging viewpoints that SBAE instructors hold of the perceptual self.

Methods

We determined that Q methodology was the best way to capture SBAE instructor's perspectives of their perceptual identity. To accomplish this, it was necessary to use a sorting procedure, called a Q-sort, which allowed participants to organize their views holistically (McKeown & Thomas, 2013). William Stephenson is credited with creating Q methodology, an approach that uses factor analysis to take the assorted perspectives of individuals and generate new theoretical typologies (McKeown & Thomas, 2013; Watts & Stenner, 2013). Q methodologists use both quantitative and qualitative approaches to offer a deeper understanding of nuanced perspectives that participants hold on a topic of interest (Watts & Stenner, 2013). As a methodological approach, Q differs from R-methodological factor analysis in that correlations are made between sorters rather than items (Brown, 1980). As such, the use of purposeful sampling techniques to select participants that exhibit a full range of viewpoints is a key feature of Q (Watts & Stenner, 2013). To begin, we provided participants a packet of 36 statements and asked them to sort the statements into three separate categories: (a) most like me, (b) most unlike me, and (c) neutral (McKeown & Thomas, 2013). Participants then self-sorted the statements and placed them onto a forced distribution (see Figure 1) in a ranking order of personal preference from -4 to +4 (McKeown & Thomas, 2013). Upon collection of all the Q-sorts, analysis of the data began by first entering data into PQ Method® version 2.35 (Schmolck, 2014). PQ Method® factor analyzes each sort through the use of a statement correlation matrix (Schmolck, 2014). Upon the identification of three distinct factors through

principal component analysis (PCA), we used abductive reasoning to analyze how the statements loaded on each factor until themes emerged (Schmolck, 2014). Finally, we conducted follow-up interviews with three high and pure loaders for each of the three perceptual identities, which helped us to interpret the arrays of the three major viewpoints identified.



Most UNLIKE Me Most LIKE Me
Figure 1. Example of a forced distribution participants received for the Q-sort.

Concourse Development

We conducted a thorough review of the literature to ensure the accurate representation of participant’s full range of beliefs (Belenky et al., 1986; Bowden, 1990; Perry, 1970; Roberts et al., 2015; Schraw, Bendixin, & Dunkle, 2002; Schommer, 1990; Schommer-Akins, 2004; Trigwell & Prosser, 2004; Van Beek, de Jong, Minnaert, & Wubbels, 2014). Further, we qualitatively analyzed written statements collected from a previous study to investigate the personal epistemological beliefs of agricultural educators. As a result, we developed four theoretical categories to structure the concourse sampling as presented in Table 1. Through the theoretical categories, we pursued statements that reflected homogeneity within each category, while maintaining homogeneity between categories.

Table 1
Theoretical Categories of the Q-Set

Theoretical Category	Category Description	Number of Statements
Dualistic Teaching	Knowledge is received. Instructors deliver knowledge to students through fact-based, lecture driven techniques	9
Multiplistic Teaching	Knowledge is subjective. The instructor presents multiple perspectives; however, knowledge remains fixed and certain	9
Relativistic Teaching	Knowledge is procedural. Instructors emphasize a process of hard work in	9

Theoretical Category	Category Description	Number of Statements
	that moves between abstract concepts and hands-on application	
Relativistic Commitment Teaching	Knowledge is fluid and contextually constructed. Instructors encouraging students to consider multiple sources and experiences to attain knowledge	9

Participants

The participants, known as the P-set in Q, consisted of 30 SBAE instructors from across Oklahoma. Upon IRB approval, we purposively chose 9 females and 22 males to reflect the larger population. Among the participants, 23 identified as white, six as American Indian, and one as other. Participants were between 23 to 57 years old and ranged in teaching experience from 1 to 34 years. We recruited participants by emailing them individually and sending them a description of the study, as well as a consent form.

Findings

Through analytic assistance from principle component analysis (PCA) and use of a varimax rotation, we chose a three-factor solution to represent our findings. To identify defining sorts, we analyzed the factor matrix (see Table 2) by establishing a base significance level of 0.41. To be considered defining, a sort must load high (significantly) and pure on only one factor (all defining sorts are bolded in Table 2). In all, 20 sorts were considered defining. For example, five sorts defined factor one, while nine and six sorts defined factors two and three. We considered sorts that did not load high and pure on only one factor to be confounded; therefore, they were not used for further analysis in this study.

Table 2

Factor Matrix with Participant Demographics

P Number/ Gender	Age	Years of Experience	Ethnicity	Factor Loadings		
				1	2	3
1-male	25	3	White	0.61	0.22	0.21
2-male	40	18	White	0.47	0.36	0.32
3-male	25	2	White	0.63	0.34	0.36
4-male	35	11	Native American	0.77	0.02	0.35
5-male	57	20	White	0.63	0.17	0.22
6-female	28	5	White	-0.16	0.67	0.37
7-male	26	4	White	0.15	0.59	-0.28
8-female	33	10	White	0.21	0.70	0.23
9-female	23	1	White	0.17	0.66	0.32
10-male	39	16	Native American	0.11	0.57	0.30
11-male	53	26	Native American	0.24	0.50	0.31
12-male	40	17	Native American	0.23	0.58	0.08
13-male	24	2	White	0.35	0.63	0.06
14-male	29	7	White	0.31	0.47	0.23

P Number/ Gender	Age	Years of Experience	Ethnicity	Factor Loadings		
				1	2	3
15-male	37	14	White	0.09	0.16	0.72
16-male	55	34	White	0.03	0.33	0.79
17-male	52	30	White	0.37	0.01	0.53
18-female	35	12	White	0.41	0.02	0.71
19-male	40	18	White	0.22	0.28	0.69
20-female	43	20	White	0.22	0.13	0.72
21-female	28	6	Native American	0.45	-0.63	-0.38
22-female	27	1.5	White	0.41	0.56	0.43
23-male	48	25	White	0.19	0.45	0.43
24-male	51	29	White	0.51	0.50	0.31
25-male	27	5	White	-0.00	0.49	0.72
26-male	25	1	Native American	0.32	-0.05	-0.07
27-female	23	1	White	-0.04	0.34	0.04
28-male	41	17	White	0.34	0.51	0.45
29-female	25	2	Other	0.54	0.49	0.45
30-male	26	4	White	0.67	0.47	0.13
Number of Defining Sorts				5	9	6
% Explained Variance				15%	20%	19%

Note. Defining sorts are bolded.

Emergent Perceptual Identities

Twenty of the participating SBAE instructors loaded significantly on one of three perceptual identities: *Diligent Educator*, *Daring Educator*, or *Devoted Educator*. All three perceptual identities stressed the need for hands-on learning episodes to enrich the acquisition of knowledge. However, each identity also held a unique perspective concerning how SBAE instructors should facilitate these experiences.

In total, five teachers with a large range of teaching experience, 2 to 20 years, held the Diligent Educator perceptual identity. This identity is mainly comprised of white males, with only one identifying as Native American. Nine teachers identified as a Daring Educator, which was the most diverse perceptual identities in terms of sex (6 males, 3 females), and also ethnicity (6 white, 3 Native Americans). The final perspective, *Devoted Educator*, was primarily composed of white males that had significant teaching experience, 12 to 34 years.

The following sub-sections provide a deeper interpretation of each perceptual identity. Interpretations drew from the in-depth analysis of how the statements loaded for each identity and through analyzing post-sort interviews with high and pure loaders. To further demonstrate the nuances of each perceptual identity, we have included evocative icons. This will demonstrate where and how SBAE instructors' epistemological positions and orientations to instruction combine in conceptual space (Watts & Stenner, 2013).



Diligent Educator

For diligent educators, learning is a process involving persistence and follow-through, much like the American farmer. In fact, effort seems to be the key to successful teaching and learning (19, +3).

Through the analysis of this male dominated perceptual identity, two major themes emerged from the data. Diligent Educators held the position that hard work is a major element of the learning process (20, +4).

Therefore, they strive to ensure their students understand the content before moving into a higher level of abstraction (27, +3). For example, Diligent Educators might use direct instruction to explain the subject matter and then carefully guide students through a step-by-step application of the concept (23, +4). Further, it is important for Diligent Educators to set and measure pre-established objectives of the learning process by clearly stating expectations. Through this calculated process, students begin to realize that no agricultural concept is too challenging for them to learn (3, -4). The key is simply putting in the necessary effort.

The second emergent concept of this identity was the belief that authority should trump opinion. For instance, diligent educators do not see value in stimulating debates or hearing from various points-of-view (15, -3). Instead, lessons are carefully crafted and delivered to students based on experience (10, -4). Therefore, through their attentiveness, Diligent Educators can deliver valuable evidence-based information to students, rather than letting them discover the information themselves (33, -3). As such, information from textbooks can often be neglected for what they, the authority, perceive as important or relevant to the students' learning experience (2, -3). One participant explained, "teaching is about sharing what you know, sometimes you just can't find that information in a textbook." The Diligent Educator also uses their authority to monitor each student's progress and clarify their expectations of the learning outcomes. Table 3 provides the central statements to this perspective.

Table 3

Array Positions for Diligent Educator Statements

No.	Statement	Array Position
20	One learns little if one does not work hard in agricultural classes.	+4
23	In agricultural courses learning is a process that moves from teaching theory to hands-on applications of the subject.	+4
26	It is important in agriculture courses to completely describe specific objectives that relate to what I expect them to learn.	+3
27	I structure my teaching in agriculture courses to help students first understand the topic and then be able to apply it to the real world.	+3
19	Knowing how to learn is more important than the acquired facts in the agricultural courses I teach.	+3
15	When teaching agricultural courses, I deliberately provoke debate and discussion. But there is always a winning side.	-3
2	In agriculture courses, I mainly concentrate on covering the information available from key texts and readings	-3
33	As an agricultural teacher, I am more a facilitator of the learning process. Students must discover the truth themselves.	-3
3	The best ideas in agriculture are usually too complicated to understand.	-4
10	In agriculture what is true is a matter of opinion.	-4

Note. Distinguishing statements are in bold.



Daring Educator

Driven by a passion to explore the depths of the learning terrain (see Table 4), Daring Educators attempt to stretch their student's ways of thinking by daring them to dig deeper into concepts (36, +4). For instance, memorization is not valued. Instead, students should be provided learning experiences that make them to question and possibly even alter their existing thoughts about agricultural topics (29, +4).

However, it is important for Daring Educators to empower their students to draw conclusions, which means they serve as a facilitator throughout the learning process, rather than an authority figure (33, +3). Dissonance is also a key element that Daring Educators employ to challenge their students' perspectives (34, +3). One Daring Educator explained,

Sometimes to get your point across, some high school kids have to thrown into a situation or problems so that they can just figure it out themselves. You know sometimes it just doesn't make sense to them unless they are facing the situation head on.

Therefore, the Daring Educator maintains that learning occurs by coming head-to-head with problems that challenge students' current frames of reference. In order to move forward, however, students must begin merging existing knowledge with new concepts. Since Daring Educators place emphasis on learning as a fluid process, they worry less about the amount of content learned and more about the depth of learning (6, -3). Therefore, an emphasis is placed on assisting learners as they begin to practice new learning behaviors and solve the issues and problems presented. They offer assistance by daring students to connect new ideas with existing knowledge; it is through this problem-solving technique that students can apply concepts to their lives, which reduces the complexity of some topics (3, -4). Through this challenging learning process, students can begin to see how their learning connects to real-world problems. Ultimately, Daring Educators try to help their students see problems differently by helping them feel limitlessness (36, +4). Daring Educators significant statements are in Table 4.

Table 4

Array Positions for Daring Educator Statements

No.	Statement	Array Position
36	I see teaching as helping students develop new ways of thinking in agriculture	+4
29	Agriculture courses should help students question their own understanding of the subject matter	+4
33	As an agricultural teacher, I am more a facilitator of the learning process. Students must discover the truth themselves	+3
28	Just teaching students only facts about agriculture is silly	+3
34	My students learn best when they are exposed to something that makes them uncomfortable. It makes them think more deeply and question their perspective	+3
4	Agriculture instructors should focus on scientific theories	-3
6	It is important to present a lot of content to students so they know what they have to learn for this subject	-3
10	In agriculture what is true is a matter of opinion	-3
2	In agriculture courses, I mainly concentrate on covering the information available from key texts and readings	-4
3	The best ideas in agriculture are usually too complicated to understand	-4

Note. Distinguishing statements are in bold.

Devoted Educator



Devoted educators find it important to *support* students throughout the learning process (16, +3), while emphasizing that learning must be applicable to their everyday lives (27, +4). In fact, they

maintain that positive learning experiences are essential before learners can gain more complex skills and knowledge. They also emphasize learning as an intuitive process that requires proper facilitation, devotion, and a shared appreciation among all of those involved (23, +4). One sorter explained,

Having a connection with my students is key. When they are feeling frustrated with learning, I try to tell a personal story about when I struggled with learning something. It seems to encourage them when they see that sometimes I struggle to.

Devoted Educators maintained that learning should challenge students to think differently. They facilitate this belief by carefully monitoring student's feelings and providing proper support (29, +3). Special time is dedicated so that students can reflect, discuss, and also form their own conclusions (16, +3). Through this support, students are able to properly form new perspectives on agricultural topics, while also feeling safe in their learning environment. For Devoted Educators, it is not about what students have necessarily accomplished, but the new heights they've reached through growing together (29, +3). For instance, group discussions and reflections stimulate various perspectives. Nevertheless, reflective writing strategies also allow students to form their own thoughts and have the final word. Ultimately, Devoted Educators goal is to help their students gain a deeper appreciation for new and diverse ways of thinking (36, +3). Devoted Educators significant statements are in Table 5.

Table 5

Array Positions for Devoted Educator Statements

No.	Statement	Array Position
27	I structure my teaching in agriculture courses to help students first understand the topic and then be able to apply it to the real world	+4
23	In agricultural courses learning is a process that moves from teaching theory to hands-on applications of the subject	+4
16	I set aside some teaching time so that the students can discuss, among themselves, key concepts and ideas in this subject	+3
36	I see teaching as helping students develop new ways of thinking in agriculture	+3
29	Agriculture courses should help students question their own understanding of the subject matter	+3
8	I should know the answers to any questions that students may put to me	-3
5	Just teaching students only facts about agriculture is silly	-3
24	How much you get from your learning in agricultural courses depends mostly on your effort.	-3
10	In agriculture what is true is a matter of opinion.	-4
4	Agriculture instructors should focus on scientific theories.	-4

Note. Distinguishing statements are in bold.

Conclusions

This study's purpose was to describe in what way Oklahoma SBAE instructors' epistemological beliefs and orientations toward instruction combine to form their dominant perceptual identities. As a result, we identified three distinct perceptual identities for SBAE instructors: Diligent Educator, Daring Educator, and Devoted Educator. Alignment of epistemological beliefs and orientations to instruction seemed to complement the agricultural education literature base. For example, results suggested that SBAE instructors' perceptual

identities are rooted in experiential learning. This finding is congruent with current agricultural education literature (Baker, Robinson, Kolb, 2012; Roberts, 2006). However, our findings also add important new elements to the knowledge base. For instance, although agricultural educators did believe in teaching experientially, each of the views differed in how they believed these experiences should be delivered to students. For example, Diligent Educators promoted hands-on learning but preferred to facilitate these experiences through teacher-centered methods. Conversely, Daring Educators—a position held by nine of the 30 participants—contended that knowledge is fluid. Therefore, SBAE instructors should be cautious to intervene during the experiential learning process. This mindfulness allows students to make mistakes and ultimately self-construct knowledge through student-centered approaches. Meanwhile, Devoted Educators—largely composed of experienced, white male teachers— maintained that the learning environment is essential to experiential learning. Therefore, they emphasized nurturing and supporting students’ learning needs through hands-on activities.

Implications, Recommendations, and Discussion

The findings from this study are encouraging given Jenkins et al.’s (2010) finding that effective SBAE instructors should provide learning experiences that are hands-on and contextual. However, the literature also demonstrates SBAE instructors tend to misjudge their conceptions of and ability to deliver effective instruction (Roberts et al., 2015; Robinson, Kelsey, & Terry, 2013; Scales, Terry, & Torres, 2009). Therefore, SBAE instructors might achieve instructional benefits by gaining a heightened awareness of their perceptual identity. For example, this awareness might help maximize instructor effectiveness given agricultural education’s diverse curricula and learning contexts (Robinson et al., 2013). To that end, we offer a conceptual diagram of SBAE instructors’ perceptual identities in Figure 2.

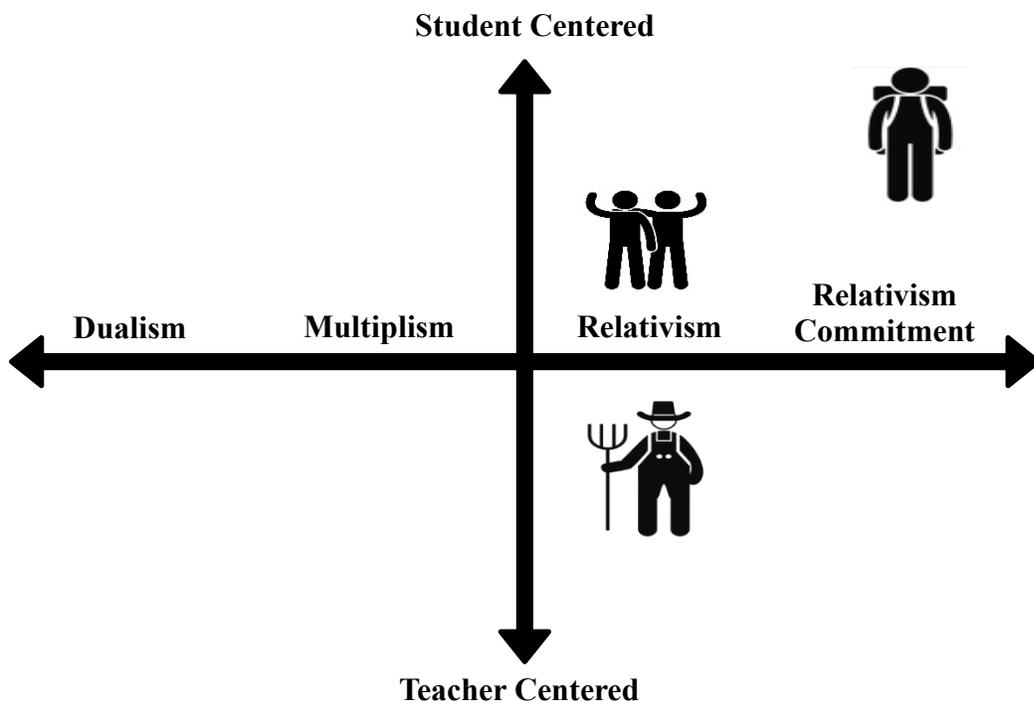


Figure 2. SBAE instructor’s perceptual identities in conceptual space.

In the diagram, the three perceptual identities—Diligent Educator, Daring Educator, and Devoted Educator—are positioned in alignment with their epistemological and instructional prioritization. Therefore, we were not only able to examine *how* epistemological beliefs and orientations to instruction combined to form the perceptual identities of SBAE instructors but also *where* they combined in conceptual space. In the future, this diagram might be used as a tool to enhance educator’s awareness of their perceptual identities. Through this awareness, professional growth might eventually be strengthened for SBAE instructors.

It is important to emphasize that each perceptual identity has a number of strengths and weakness associated with its unique position. However, through greater awareness, educators can begin to enhance their effectiveness by monitoring and adjusting their teaching style to complement students’ learning preferences (Hyytinen et al., 2014). Therefore, educators can make purposeful pedagogical decisions given the unique learning terrain in which they find themselves. Mindfulness of one’s perceptual identity can also allow instructors to adapt the design of their courses. Over time, these changes might help instructors to mature into skilled professionals that can recognize the needs of their students and adapt their practices accordingly. Such changes could also allow SBAE instructors to align more congruently with characteristics of effective instruction, which call them to “effectively determine student needs, plan for instruction, and evaluate students” (Roberts & Dyer, 2004, p. 85).

To help concretize the importance of epistemological positions and orientations to instruction for SBAE instructors, we offer the following recommendations for praxis for each perceptual identity. We would first like to emphasize that before SBAE instructors can increase their effectiveness, they must be open to transitioning into positions that go against their natural preference. Diligent Educators, for example, prefer to deliver instruction through teacher-centered approaches that emphasize hard work. We recommend that Diligent Educators recognize that to connect with learner’s interests, that they take time to build relationships and promote autonomy throughout the learning process (Rogers & Meek, 2015). On the other hand, Daring Educators prefer to allow students the flexibility to test boundaries and construct their own knowledge. Nevertheless, it is important for Daring Educators to recognize that at times an outcomes-oriented approach is needed to ensure that quality standards are being met. And finally, Devoted Educators feel it necessary to support students throughout their learning endeavors. Yet mounting empirical evidence demonstrates that dissonance can often lead to deeper, more transformative learning (Mezirow, 1991; 2000). Therefore, Devoted Educators should recognize when a *hands-off* approach might promote more meaningful learning. Moving forward, we recommended that additional research be conducted to determine if SBAE instructors and pre-service teachers epistemological positions and orientations to instruction truly reflect their practices. Although the perceptual self is a complex construct, understanding its depths might hold powerful implications for the agricultural education discipline.

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The Black Swans of Agricultural Education: An Empirical Account of the Unique *Lived Experiences* that Structure Urban Agricultural Educator's Meaning in Work

Abstract

Urban agricultural educators face a number of unique challenges in performing their job duties. Therefore, the purpose of this transcendental phenomenology was to understand the essence of urban agricultural educator's meaning in their work by exploring their lived experiences. Through the development of the participant's structural descriptions, the essence of this phenomenon emerged from the data in the form of a metaphor: A Black Swan. The black swan represents a distinctiveness participants conveyed that urban agricultural educators possess in the agricultural education discipline. The black swan is guided by fusing individualization, self-connection, contribution, unification, and coping into a powerful construct identified as transcendence. Each element of the transcendence construct served as a theme in this study. Moving forward, the study's findings could be used as a foundation to explore and refine the discipline's current understandings of urban agricultural educator's meaning in work.

Introduction

The discipline of agricultural education is struggling to keep qualified teachers in the profession (Kantrovich, 2010; Talbert, Vaughn, & Croom, 2007). Although efforts to get to the core of this issue should be commended (Mundt & Conners, 1999; Myers, Dyer, & Washburn, 2005; Roberts & Dyer, 2004; Torres, Lambert, & Lawver, 2009), the reality is this crisis only continues to intensify (Tippens, Ricketts, Morgan, Navarro, & Flanders, 2013). Clark (2013) suggested that a deficiency in agricultural educator's ability to make meaning in particular areas of their career might be at the very heart of this issue. As such, meaning in work arises as a critical line of research for the agricultural education discipline (Clark, 2013).

Meaning in work refers to whether individuals can determine if their work is a fulfilling endeavor (Pratt & Ashforth, 2003). The interpretation of one's labor as rewarding can influence their job satisfaction (Wrzesniewski, Dutton, & Debebe, 2003). In fact, it is often cited as a positive predictor for desired job performance and promotion status (Ryff & Singer, 1998). The literature (Frankl, 1997; Isaksen, 2000; Shanafelt, 2009; Yalom, 1980) suggests that meaning in work is deeply tied to having career purpose. For example, meaning drives an individual's will power to overcome everyday obstacles and promotes a thirst for life that is key to achieving a healthy lifestyle (Frankl, 1997). Those who have meaning in work are less affected by work-related challenges and find more value in their job duties (Frankl, 1997). Further, meaning in work reduces feelings of boredom, and perceptions that job-related tasks are tedious or lacking purpose (Shanafelt, 2009). Consequently, as individuals discover meaning in their work, their innate talents are better utilized, and they also enhance their personal welfare due to satisfaction with their lives (Shanafelt, 2009).

Currently, empirical evidence exists regarding career benefits and challenges for school-based, agricultural educators (Clark, Kelsey, & Brown, 2014; Lambert, Henry, & Tummons, 2011; Talbert, Camp, & Heath-Camp, 1994). Enns (2008) argued, however, that urban areas are one of the ripest sources for prospective growth for the agricultural education discipline and deserved more attention in the literature. Currently, we understand urban agricultural educators face a number of unique challenges in performing their job duties (Warner & Washburn, 2009). Those challenges include a heightened sense of pressure to implement requirements from legislative acts, as well as a lack of agricultural literacy from key stakeholders (Warner & Washburn, 2009). To address these issues, Warner and Washburn (2009) called for further examination of the careers of urban agricultural educators. As such, a need existed to understand how urban agricultural educators find meaning in their work.

Purpose and Research Question

The purpose of this transcendental phenomenology was to understand the essence of urban agricultural educator's meaning in their work by exploring their *lived experiences* (Moustakas, 1994). As concerns regarding the number of qualified SBAE instructors mount (Doerfort, 2011), a greater understanding of urban SBAE instructors' meaning in work may provide insight into ways to better prepare and retain individuals that seek employment in urban locations. As a result, the following research question framed this investigation: *In what ways do urban Oklahoma agricultural educator's lived experiences help form their meaning in their work?*

Research Design

Because we chose to position this study in the constructionist epistemological position (Crotty, 1998), we decided the transcendental phenomenological approach would best guide our journey to understand how urban agricultural educator's constructed meaning in their career (Koro-Ljungberg, Yendol-Hoppy, Smith, & Hayes, 2009). The phenomenological concept was first developed by Edward Husserl and later expanded through the works of Merleau-Ponty (Creswell, 2013; Moustakas, 1994). Husserl used phenomenology to depict worldly human experiences, a notion he termed the *lifeworld* (Moustakas, 1994). However, it was Merleau-Ponty (1962) who operationalized this theory into a methodological tool in which the lifeworld of individuals can be used to extract an ultimate understanding of their lived experiences.

The phenomenological approach is appropriate for investigating, "affective, emotional, and often intense human experiences" (Merrriam 2009, p. 26). To reveal the essence of such experiences, we decided to analyze the data through Moustakas' (1994) transcendental phenomenological model. Moustakas' (1994) model has four key elements: (a) epoche, (b) phenomenological reduction, (c) imaginative variation, and (d) a synthesis of composite textural and composite structural descriptions. To complement the phenomenological approach, we built the following quality standards into this study: coherence, credibility, ethics, resonance, rigor, and sincerity (Tracy, 2010). Throughout the remainder of this section, we will highlight our use of the phenomenological model and our techniques for integrating each quality standard.

Participant Selection and Data Collection

A hybridized sampling procedure consisting of both criterion and purposeful methods allowed us to select participants that met the requirement of working in an urban school system (Miles, Huberman, & Saldaña, 2014; Patton, 2002). In this study, we used the 2010 United States Census data to identify current agricultural educators in urbanized areas. An urbanized area consists of at least 50,000 people (U.S. Census Bureau, 2010). In all, 19 ($N = 19$) agricultural educators met this criterion in Oklahoma. Thereafter, we purposefully selected six participants ($n = 6$) we believed taught in a school system that reflected the cultural aspects of an urban school.

To uphold the highest *ethical* standards (Tracy, 2010), we sought Institutional Review Board (IRB) approval. Thereafter, semi-structured, open-ended interviews (Patton, 2002) ranging from 45 to 90 minutes were conducted at participants' place of work and served as the primary source of data. Interview questions were developed based upon the overarching research question of the study. However, additional probing questions were used in an attempt to unveil the essence of the phenomenon. Audio from interviews was recorded using an iPhone® application. Then, audio was downloaded to a password-protected computer where it was transcribed verbatim. Interviews, observations, and documents helped to triangulate findings and achieve *credibility* by providing a more holistic view of the phenomenon (Tracy, 2010).

Data Analysis

We began the analytic process by exploring the depths of our past experiences related to the phenomenon of interest through a technique known as *epoche* (Moustakas, 1994). Through this practice, we sought out our biases (Moustakas, 1994). For example, our experiences as agricultural educators in Oklahoma and our previous work with urban populations had the potential to cloud our perspective as we analyzed the data. To set aside these personal assumptions and beliefs, we attempted to bracket out any biases by: (a) being aware of our preconceptions, and (b) analyzing significant statements from multiple vantage points (Moustakas, 1994). These techniques also allowed us to achieve *sincerity* when reporting our findings (Tracy, 2010).

After understanding and putting aside our biases, we entered an incubation period to reacquaint ourselves with the participants' lived experiences (Patton, 2002). We analyzed each transcript and artifact several times and then returned to audio recordings of participant's interviews to understand the inflection expressed in each statement. This period of incubation allowed us to become more in-touch with the data, which was necessary before initiating the *phenomenological reduction* phase (Moustakas, 1994).

We then revisited the data corpus to identify *significant statements* that represented how participants experienced meaning in work (Moustakas, 1994). In this step, we analyzed all artifacts and "treated the data as having equal weight" through a technique called *horizontalization* (Merriam, 2009, p. 26; Moustakas, 1994). From the data corpus, we identified 486 significant statements and assigned each statement to a *horizon*. Then, through an intense deductive phase, we clustered the horizons into 111 *delimited horizons* (Moustakas, 1994).

When analyzing the *delimited horizons*, we noticed a parallelism between their meaning and numerous theories associated with the meaning in work literature. Despite noting these connections, however, we intuitively sensed gaps and inconsistencies when comparing them against the data. To continue to maintain the highest *ethical* standards, we chose to move forward by *working against ourselves* through a process known as *imaginative variation* (Moustakas, 1994). We accomplished this rigorous qualitative process by analyzing our data through numerous vantage points using three key questions as a guide:

1. How does the phenomenon relate to the tenets of this theory?
2. In what ways does our data differ from this theory?
3. What consequences could result from applying our data to this theory?

Through the imaginative variation technique, we explored a wide-range of frameworks and rival explanations that might better represent our data. However, Rosso, Dekas, and Wrzesniewski's (2010) *Pathways of Meaningful Work Model* demonstrated the greatest *theoretical fit*. To further scrutinize the theory against our data and achieve standards for *rigor* (Tracy, 2010), the 111 delimited horizons were reduced into five non-overlapping, *invariant themes* (Moustakas, 1994). All themes, except for one, aligned with Rosso et al.'s (2010) theory. Our initial hunch that a fit between the theory and the data acquired from this study gained further empirical grounding. We could not deny, however, that one theme did not align with Rosso et al.'s (2010) theory. So we further explored the layers of meaning contained in the incongruent theme. Initially, we noticed these significant statements had been coded with a negative connotation such as stress, student problems, controlling stress, or dealing with problems, etc. However, upon a deeper analysis, we began to understand participants were not simply venting about their challenges. Instead, they were explaining how they found meaning by *coping* with these challenges. Through the journey to understand this theme, we discovered Rotter's (1954) *locus of control* construct. This theory provided a broad framework in which to analyze the themes discrepancies and was used to help interpret the final theme. Ultimately, each of the five themes provided insight for developing composite *textural* and *structural* descriptions of the participants (Moustakas, 1994).

The individual descriptions helped explain *what* meaningful work was to the participants and *how* it was experienced (Moustakas, 1994). Reaching this level of understanding was possible through synthesizing and integrating the individual textural and structural descriptions of participants (Moustakas, 1994). As such, the final element of Moustakas' (1994) model, the synthesis of composite textural and composite structural descriptions, ultimately became the key to unveiling the essence of the phenomenon in this study (Moustakas, 1994).

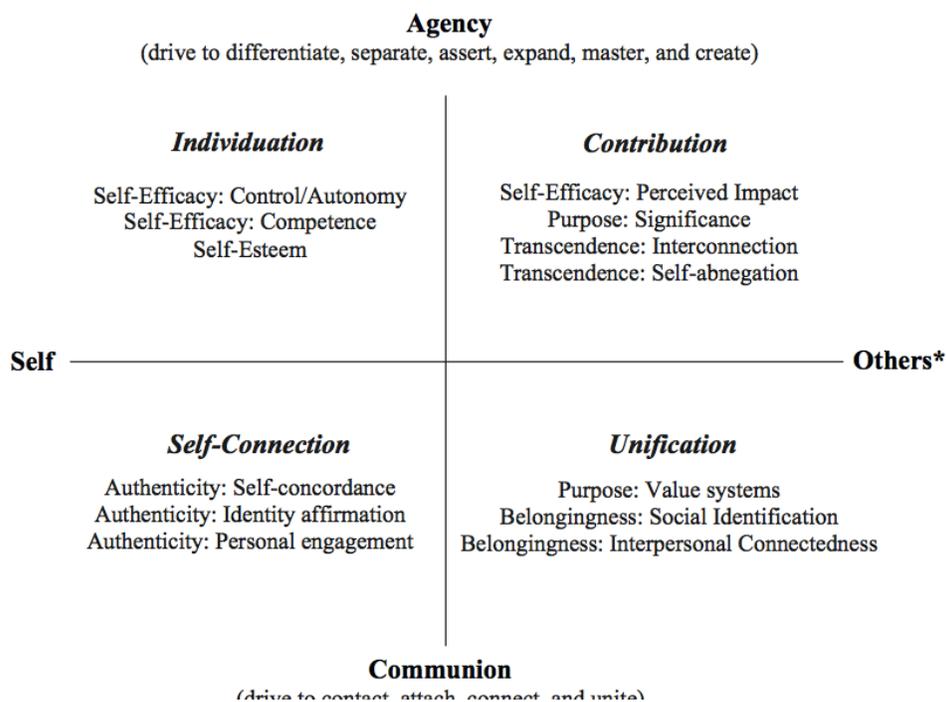
To emphasize *coherence* (Tracy, 2010) of the findings, we have purposefully chosen to *break away* from the traditional ordering of research manuscripts. This technique allows us to achieve *resonance* by presenting findings more evocatively (Tracy, 2010). Also, through this tactic, we hope to encourage our readers to assess the congruence of two theoretical frameworks with the studies findings. Therefore, we will introduce the emergent theoretical frameworks, followed by the essence of the phenomenon, a presentation of the themes, and conclude with a discussion of the conclusions and implications of the results. Through this purposeful scheme, we hope our readers can gain a deeper appreciation for the complexity, layers, and nuances of the findings by *beginning with the end in mind*.

Emergent Theoretical Frameworks

Rosso et al.'s (2010) Pathways to Meaning in Work Model emerged as a lens for better understanding the phenomenon. Through this insight, we were able to explore better the inner-structure of the essence of urban agricultural educator's meaning in work. The theory suggests personal idiosyncrasies in the work environment govern how individual's construct meaning in their career (Rosso et al., 2010). However, Rosso et al. (2010) distilled these unique characteristics into four pathways: individualization, contribution, self-connection, and unification. The four pathways are centered on a continuum of two key modalities: (a) one's inherent motivates, differentiated through the comparison of agency versus communion, and (b) whether work actions are targeted towards the self or others, contrasted through the comparison of self versus others.

In the first contrast, Rosso et al. (2010) asserted agency is represented by an individual's internal need to "separate, assert, master, and create" (p. 114). Meanwhile, on the other end of the spectrum, individuals can also have a desire to "contact, attach, connect, and unite" in their job environments (Rosso et al., 2010, p. 114). The second contrast, self versus others, takes into consideration whether an individual's experiences are perceived as meaningful internally (self) or externally (others) (Rosso et al., 2010). These distinctions ultimately generated a

(see



bidimensional model (see Figure 1) used to construct the four pathways of meaningful work.

Figure 1. Rosso et al.'s (2010) Pathways to Meaning in Work Model from "On the meaning of work: A theoretical integration and review" (p. 114), by B. D. Rosso, K. H. Dekas, and A. Wrzesniewski, 2010, *Research in Organizational Behavior*, 30, pp. 91- 127. Copyright 2010 by Elsevier B.V.

Rosso et al. (2010) offered the following definitions for each pathway:

1. Individuation – reflects the meaningfulness of actions that define and distinguish the self as valuable and worthy.
2. Contribution – reflects the meaningfulness of actions perceived as significant and/or done in service of something greater than the self.
3. Connection – reflects the meaningfulness of actions that bring individuals closer into alignment with the way they see themselves.
4. Unification – reflects the meaningfulness of actions that bring individuals into harmony with other beings or principles. (p. 115)

Ultimately, Rosso et al.'s (2010) Pathways to Meaning in Work Model helped explain the fluid and complex nature of how individuals experience meaningful work. Additionally, the model allows sources of meaning to be categorized, compared, and contrasted (Rosso et al., 2010). It is important to note an individual may find meaning through any of the four pathways. However Rosso et al. (2010) theorized the intersection of the pathways is where one experiences a heightened sense of meaning from work.

Although we interpreted the first four themes through Rosso et al.'s (2010) theory, the fifth theme reflects Rotter's (1954) locus of control construct for interpretative value. This theory centers on the idea that individuals largely control how their life plays out (Rotter, 1954). Daft (2014) explained some believe "they are the masters of their own fate" (Daft, 2014, p. 104). An individual's locus of control explains whether they place responsibility for how their life unfolds within themselves or through external forces (Northouse, 2015). Individuals with a high internal locus of control believe they control what happens in their lives (Rotter, 1954). Meanwhile, those with a high external locus of control tend to believe that an external force, often in the form of stress, determines how they *cope* with struggles in their lives (Rotter, 1954).

It is through these theoretical frameworks— Rosso et al.'s (2010) Pathway's to Meaningful Work Model and Rotter's (1954) locus of control construct— that we offer our interpretation of the *eidos*, or the pure essence of the phenomenon, in the following section (Moustakas, 1994).

The Essence of Urban Agricultural Educator's Meaning in Work

Through the development of the participant's structural descriptions, the structure of the essence emerged from the data in the form of a metaphor: *A Black Swan*. The black swan represents a distinctiveness participants conveyed that urban agricultural educators possess in the agricultural education discipline. For example, although the black swans in this study felt they belonged to a larger *flock*, the agricultural education discipline, analysis of their shared experiences revealed they sensed they possessed a *rarity* that sets them apart. However, this uniqueness is not viewed as a negative, or marginalizing. Instead, the black swans take pride in standing out from the masses. As such, the black swan metaphor will serve as the structural frame throughout the remainder of this paper.

After grounding the 111 delimited horizons into Rosso et al.'s (2010) *Pathways to Meaning in Work* model and Rotter's (1954) locus of control construct, the inner-structure of the essence emerged: *transcendence*. As a result, data from this study suggested that urban agricultural educators uniquely transcend normal levels of meaning in their career by coalescing the two aforementioned theories into the structural frame of a black swan.

To enhance clarity, we offer a visual representation of the essence in Figure 2. The representation features the structural frame of a black swan that is guided by fusing individualization, self-connection, contribution, unification, and coping into a powerful construct identified as transcendence. Each element of the transcendence construct will serve as a theme in findings section.



Figure 2: The essence of urban agricultural educator's meaning in work.

The Black Swans — A Formal Introduction

Each participant will now be formally introduced to promote greater transferability of this studies findings. Through the time we spent with each individual, we have come to cherish the passion and dedication that each of these individuals has for the agricultural education profession. We also deeply appreciate how they embrace the qualities and traits that distinguish them. It is with utmost respect and admiration that we collectively refer to this group as *The Black Swans*. We urge our readers to analyze critically the backgrounds and *lived experiences* of each black swan to determine if their insights might be transferred to a comparable context. To protect the participant's identity, a pseudo-name will be used for each.

- **Allen** – As a white fourth-year teacher, Allen has a burning passion to make an impact on his students' lives. In his program, over 90% of students are low-income and of African American descent. Despite facing a number of unique challenges in his job, he has embraced his role as a school-based, agricultural education teacher in an urban area.
- **Amy** – After growing up on a dairy farm and moving to Oklahoma for college, teaching in an urban location was a big transition for Amy. However, after seven years she now feels like she is finding her

stride after deciding to view the downsides of teaching agricultural education as something “cool and beautiful” rather than a challenge.

- **Chase** – With a high-achieving, confident personality Chase was drawn to teaching so that he could push students to become passionate about agriculture. He accomplishes this by encouraging students to compete at a high-level through the various Career Development Events available through the National FFA Organization.
- **Danny** – After growing up in a low-income, transient home, Danny was finally able to find his place after enrolling in an agricultural education course. Now, with 17 years of teaching experience, he hopes his diverse, low-income students can also find their place in his program.
- **Sarah** – With a recent transition to a teaching position in an urban location, Sarah has been experiencing major changes in how she perceives herself as an agricultural educator. For example, after seeing students struggle with meeting basic needs, Sarah now feels she is starting to see a bigger picture of how her job can make a real difference in her student’s lives.
- **Scarlett** – As a career teacher with 16 years of experience in multiple states, Scarlett pursued an urban teaching position so she could work with diverse students. Although she is native to Oklahoma, Scarlett enjoys being untraditional in her traditional state.

Findings

The findings of our investigation will be presented through five *themes of meaning* (Moustakas, 1994). Each theme reflects a powerful component of the essence of urban agricultural educator’s meaning in work, as depicted in Figure 2.

Individualization from the Flock

The black swans expressed those in their flock (i.e. teachers, students, others players in the agricultural education discipline), often view them as *different*. Allen explained,

I will be honest with you, being an urban Ag teacher is kind of like being a women back in the seventies and eighties. Meaning you cannot go out and do stuff. So, a lot of times working with a different set of kids, you are looked at different. Sometimes other Ag teachers think that because you are in an urban Ag program you are not as good as they are. When in reality sometimes you do twice the work for half the recognition, because you are dealing with students who on top of working a forty hours a week, are coming in and taking night school classes to make sure that they can graduate. [3087: 3096]

The black swans perceived they were viewed as unique and different. However, they did not view this as a marginalizing feature. In fact, they seemed to interpret this aspect of their career in a positive way. For example, participants seemed to make meaning by helping to “break the stigma” [Danny, 2133: 2134] associated with urban agricultural programs. In their minds, they were helping other agricultural educators, school administrators, and even state agricultural education staff to recognize the unique roles, positions, and challenges urban programs face.

The black swans also sought individualization by “distinguishing themselves as valuable and worthy” (Rosso et al., 2010, p. 115). Sarah achieved individualization by being unique and working with the resources she had available. She explained, “we definitely have to think outside the box for us to be able to actually do what we do in Ag” [Sarah, 3034:3035]. Individualization is a key to experiencing career meaning in the lives of urban agricultural educators in this study. All participants seemed to express a desire to stand out and be acknowledged for their unique idiosyncrasies. Though this fulfilled desire, the black swans were able to activate Rosso et al.’s (2010) first meaning in work pathway.

Birds of a Feather — The Importance of *Self-Connection*

The black swans are unique. Despite their distinctiveness, however, they seem to have a deep craving to *connect* with others in their flock through shared experiences; similar to the age-old adage, “*birds of a feather flock together.*” The black swans deep self-connection with their peers and students ultimately promoted a richer sense of career meaning. They expressed that self-connections were important to have with both urban and traditional agricultural education teachers. For example, Danny found meaning by sharing his lived experiences, particularly, those about engaging students of a low socio-economic status in his program. He explained, “When I get together with urban Ag teacher friends and colleagues, I’ll start telling them, “Well, man. I had this student do this,” and they’ll say, “I’ve had that.” However, when I talk to more traditional Ag teachers, they’re like, ‘I’ve got these kids that come in and they can’t afford to be involved, ‘So, what do you do?’ Where the traditional ag teachers might say, ‘Well, its only one or two kids. I’ll give them a worksheet and work with these other kids.’ I’m like, ‘Well, what if your whole class was like this? You just can’t push them aside and only work with your upper class kids.’ [Danny, 2010:2021]

Danny felt as though he was able to offer traditional agricultural education teachers a unique perspective that helped make a contribution. On the other hand, Sarah’s deep connection with her teaching partners helped her to overcome the challenges and difficult times she faces in her career. She gratefully whispered, “My teaching partners are the ones I vent to. You know, my three teaching partners, we’re really good friends. That makes life a whole lot easier for dealing with the challenges you face in an urban program. If you get along with them, it makes your life easier. We’ve got a really great connection. [Sarah, 2644: 2647]

On the other hand, Scarlett explained an important *self-connection* that assisted in her meaning making was building relationships with her urban students. Many of her students do not have a great home life; therefore, by giving them advice and an adult perspective she seems to play an important role in their lives. Scarlett elucidated,

As an urban teacher you have to recognize that there are certain issues going on with your students. They may be working a late job or not have enough food to eat. *You just have to connect with them and build a relationship* [Emphasis added]. I say, ‘Hey, we need to come in here and talk. You’re slipping in school. What is going on?’ And a lot of times they’ll be a lot more open with us and connect with us over things that are going on and maybe we can be a little more accommodating to them. [254: 260]

Through building and maintaining relationships with their peers and students, the black swans found meaning by feeling as though they were deeply connected to their flock.

Contribution to the Flock

Though proud of their distinctiveness, the black swans also strive to make significant *contributions* to their flocks—the agricultural education discipline. For instance, participants described guiding their students toward discovering a passion for agriculture as a source of pride in their careers. In fact, the contributions they conveyed seemed to be deep personal victories. Amy passionately explained,

I love providing an opportunity for kids that they wouldn’t get in an English class, a science class, a math class. Through my experiences, I had so many opportunities that were forwarded to me just from being a member. I want to provide that same experience for these kids. And with our population being primarily an urban population, they don’t have the farm experience to fall back on. So just being a member in the class and in the program they get experiences that they wouldn’t have elsewhere. [32:40]

Sometimes the black swans even help contribute by assisting students through troubling times. Sarah explained, “I keep crackers in my desk, which is something that I never did when I was elsewhere [teaching], but these kids, that may be the only thing they get to eat besides school lunch” [2468: 2470]. Chase also took his role in

making contributions in the lives of his students seriously. For example, pushing students to achieve more helped provide him feelings of pride and ultimately a deep sense of career meaning. When speaking about his contributions, he proudly explained,

If there are some students that we [ag teachers] just don't think is really meeting up to our expectations for them and living up their potential, we'll pull them into our office and discuss with them and have back and forth conversation and try to ask them questions, figure out what their deal is, and make a contribution to them. [Chase, 1467: 1470]

By supporting and guiding their students through the twists and turns of life, the black swans seemed to feel as though they were making significant *contributions* to their flocks.

Free Bird — The Power of *Unification*

For the black swans, having the *freedom* to uphold their values in their role as an urban agricultural educator seemed to stimulate a powerful *union* between their work and personal lives. This factor appeared to be deeply embedded in their personal frame of reference and even permeated their entire sense of work being. This belief was especially prevalent for Allen, a passionate young teacher, who felt empowered by his ability to uphold his values in his role as an urban agricultural educator. He described being able to help those less fortunate than himself as a unification of his values and career. In a powerful statement he expressed,

A lot of these kids will look at you as mom or dad sometimes, and so I may give them a ride home after school. They say, "Mom cannot come pick me up until 7:00 p.m. can you give me a ride?" Those are the kind of things urban ag teachers deal with. I had a kid last year, he could not afford to eat, and his parents did not get the free and reduced lunch filled out so he walked around for three days without eating until I had to put money on his account. [Allen, 3138: 3143]

On the other hand, Sarah unified her work and personal needs through developing an understanding of how her job allowed her to provide an important role to society. Sarah recognized that many urban students often do not feel as though attaining a good job or going to college is an option for them. Impassioned by the opportunity to help open her student's eyes to their potential. Sarah explained,

I think we're molding students into what we would hope they would become. I want them to go out and get a job and pay social security. I want my urban students to break the stigma by being contributors to this society and not a hindrance to it. Therefore, I think being an urban agricultural educator is a noble and honorable career. The money is not great, no, but there is lots of honor in knowing that you can help these kids, whether it was one or fifty, you helped save one. [2601: 2608]

By stepping back and analyzing their personal and career needs, the black swans were able to merge the two and attain a powerful sense of *unification* in their lives. With the addition of the fourth theme, the black swans uniquely activated all four of Rosso et al.'s (2010) pathways to meaningful work.

A Bird's Eye View — *Coping through Self-Awareness*

The first four themes of the study highlighted important sources of career meaning for the black swans through the lens of Rosso et al.'s (2010) theory. However, the final theme offers an interesting departure. Data from this study suggested the challenges urban agricultural educator's face were also viewed as important sources of meaning for the black swans. Although the term challenges may hold negative connotations, and rightfully so, it appears to lay the foundation for the black swans to experience a heightened sense of meaningfulness. For example, the black swans seemed to view challenges in their career as times when their locus of control (Rotter, 1954) tipped from being more internally to being externally controlled. However, participants explained that while learning to manage the struggles of her career is stressful, it can be exhilarating to learn to exert control

over their challenges. Allen explained, “[Teaching] is kind of like that non-stop whirlwind. And I love that now” [3338: 3339].

Amy described a similar experience when working with her students. For example, at times when her students did not follow through with projects it can be frustrating because she feels as though it negatively reflects her abilities as a teacher and leader. When these challenges begin to influence her career life, however, Amy makes a purposeful attempt to balance her locus of control by stepping back and taking a *birds eye view* of her position. She revealed,

At times it's just like a mess. But it's a mess in which something meaningful comes from it. The kids grow, even a situation that you don't think turned out the way you envisioned, the kids still love it or have good time. When I say, "mess," that seems negative, but I don't mean in a bad way. I really think it's just a mess, but sometimes messes can be pretty cool and beautiful. [Amy, 565: 570]

Although the black swans experienced various challenges, a deep sense of career meaning can be gleaned by learning to offset negative thoughts and regulate their locus of control.

Conclusions, Recommendations, Implications, and Discussion

The purpose of this study was to understand the essence of urban agricultural educator’s meaning in their work by exploring their lived experiences (Moustakas, 1994). In this study, participants seemed to be satisfied with their careers as agricultural educators and found meaning in multiple ways, which is consistent with existing empirical evidence (Clark, 2013; Clark, Kelsey, & Brown, 2014; Chenevey, Ewing, & Whittington, 2008; Walker, Garton, & Kitchel, 2004). However, participants also found meaning by embracing their unique qualities, a view not currently reflected in the literature. We, therefore, encourage teacher educators, state agricultural education staff, and local administration to promote a culture in which urban agricultural educator’s feel as though they are valued for their distinctiveness. To accomplish this, perhaps pre-service teachers should spend time observing and teaching in an urban setting. Through this experience, a greater understanding and appreciation for the advantages and challenges of urban programs might be reached.

Consistent with current literature (Brown, Roberts, Whiddon, Goossen & Kacal, 2015; Warner and Washburn, 2009), we also found that urban agricultural educators might face unique challenges in their careers. This finding was especially true regarding the lack of agricultural knowledge among urban agricultural educator’s students and stakeholders of their programs (Brown et. al, 2015; Warner & Washburn, 2009). However, our findings suggested that urban agricultural educators might cope with their challenges in unique ways. For example, Lawver and Smith (2014) reported that agricultural educators use three major approaches to cope with stress: (a) distancing, (b) confrontive actions, and (c) a combination of both the distancing and confrontive methods. However, participants in this study seemed to find meaning by learning to cope with their challenges through self-awareness techniques. Perhaps, the unique populations urban agricultural educator’s serve could contribute to this incongruence. For example, participants reported their programs were largely comprised of minority students living in low socioeconomic households. Therefore, urban agricultural educators might continuously be faced with issues that help to remind them of the important role they play in lives of their students.

Findings also suggested urban agricultural educator’s meaning in work is not only multi-layered but also integrative (see Figure 2), a notion not yet reflected in the agricultural education literature. By identifying key elements of participants meaning in work, we were able to elucidate meaningful insights into the transcendence construct. However, it was also important to understand *how* these elements combined holistically to shape the urban agricultural educators meaning in work. We, therefore, recommend researchers place emphasis on understanding *how* the various elements of an individual’s meaning in work influence their career satisfaction.

This study extends theoretical understandings of Rosso et al.'s (2010) Pathway's to Meaningful Work Theory and Rotter's (1954) locus of control construct. However, it should be noted that meaning in work is a highly subjective phenomenon (Rosso et al., 2010). In the current study, participant's beliefs and views seemed to be influenced by cultural and social forces. Existing literature, however, suggested the individual is the primary determinate of meaning construction (Clark, 2013). Perhaps, more attention needs to be placed on understanding how the urban environment may uniquely shape the meaning making of urban agricultural educators.

Our work, thus far, has provided new insights into urban agricultural education. However, we realize more effort is needed. Our hope is that through this investigation we have brought about coherence to this line of research by illuminating the core elements of how the urban agricultural educator's experience meaning in work. Moving forward, we recommend researchers use the studies findings as a foundation to explore and refine the agricultural education's current understandings of this complex phenomenon.

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Connecting Problem-Solving Style to Peer Evaluations of Fellow Team Members' Performance in Secondary Cooperative Learning Projects

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Abstract

With an evolving and expanding agricultural industry, it is crucial to provide future professionals with valuable experiences and skills in problem solving, communication, and teamwork. Agricultural summer programs, which provide cooperative learning experiences with a focus on group work and problem solving, aim to meet the current demand in agricultural fields. However, little is known about how individual problem-solving styles impact students' perceptions of other group members and their overall team synergy. This study utilized a quantitative, quasi-experimental design to further explore how high school students' problem-solving styles impact their perceptions of group members in a cooperative learning experience during Virginia Governor's School for Agriculture (VSGA). The findings and recommendations can assist instructors in providing cooperative learning experiences to their students and further maximize high school student's cognitive functions.

Introduction

As agriculture continues to evolve and expand, the demand for qualified professionals with valuable experience and skills, beyond content knowledge, continues to grow. Amongst these abilities are problem solving, communication, and team skills (Crawford, Lang, Fink, Dalton, & Fielitz, 2011). Agricultural summer programs for gifted high school students aim to provide hands on experiences and agricultural literacy, regarding job possibilities within the agricultural sector, to aid in meeting this demand (Cannon, Broyles, Seibel, & Anderson, 2006).

These programs should include cooperative learning strategies, which allow students to solve complex problems within a small group. Literature has demonstrated that cooperative learning is superior to individualistic learning strategies (Gundersen & Moore, 2008; Rau & Heyl, 1990; Springer, Stanne, & Donovan, 1999). "Isolated students do not learn as much or as well as students who are embedded in a network of informal social relations" (Rau & Heyl, 1990, p. 144). Further, cooperative learning allows for students engage in group work that leads to greater achievement of problem solving and teamwork skills, which provide students with transferable skills to the workforce (Oakley, Felder, Brent & Elhaji, 2004).

One's problem-solving style has been known to cause conflict within groups from a lack of understanding of varying styles (Kirton, 2003). Research on problem-solving style has examined how groups work together (Buffington, Jablokow, & Martin, 2002; Buttner & Gryskiwewicz, 1993; Goldsmith, 1984; Hutchinson & Skinner, 2007; Kaufman, 2004). However, there is a gap in the research with regard to problem-solving style at the secondary education level. Based on the National Research Agenda for Agricultural Education, it is important to advance practices and programs by increasing problem-solving, transfer of learning, and higher order thinking within agricultural contexts (Doerfert, 2011). Therefore, a study exploring how the problem solving styles of high school students influence their perceptions of group members during a cooperative learning experience could provide insight into teaching strategies for the advancement of problem solving technologies.

Theoretical Framework

The theoretical framework for this study is based on group learning pedagogy and Adaption-Innovation Theory (Kirton, 2003).

Group Learning Pedagogy

Collaborative learning, cooperative learning, peer learning, and group work are all synonymous terms within a group learning pedagogy, which involves students teaching each other through work in small teams (Gunderson & Moore, 2008). This is one of the most used and favored active learning pedagogical strategies in education today because it gives students the opportunity to gain valuable information through interaction with their peers and environment (Tsay & Brady, 2010). This interaction allows an opportunity for a student's social skills to be enhanced within a setting where they are able to express their opinions, whether they be conflicting or in agreement with team members. This process forces students to think outside of the box and gain further perspectives through group discussions (Tsay & Brady, 2010).

Cooperative learning is based on the premise of "two heads are better than one" (Johnson & Johnson, 1999). In order for the learning group to be considered cooperative learning, there must be shared goals and beneficial outcomes for all members. Additionally, these team members must support and encourage each other, which should lead to higher academic performance (Johnson & Johnson, 1999). Not all instances where students are placed on a team are cooperative learning experiences.

Cooperative learning occurs when the following five basic elements occur: positive interdependence, individual accountability, face-to-face promotive interaction, social skills, and group processing (Johnson & Johnson, 1989). Positive interdependence occurs when a student believes they cannot succeed unless the whole group succeeds, which is normally based on a common goal. Students must also be assessed individually and receive their scores for individual accountability to take place. Face-to-face promotive interaction then occurs through actively encouraging and supporting each other's efforts. The student's must possess social skills, which aid in collective decision making. All of these elements allow group processing to occur, where the students discuss their progress towards their goals without negatively impacting group relationships (Johnson & Johnson, 1989).

Group processing can be related to Tuckman's Stage of Development Model, which includes the forming, storming, norming, and performing stages (Tuckman, 1965). A group must become familiar with each other and the standards of their team. The storming stage then occurs where conflict transpires and causes the group to suffer from the adversity (Tuckman, 1965). The norming stage brings about a feeling of cohesiveness and leads the team to the performing stage. In the performing stage, the group utilizes their team structure to aid in problem solving efficiency (Tuckman, 1965). A team must complete all stages of Tuckman's Stage of Development Model to achieve group processing and truly engage in cooperative learning.

Adaption-Innovation Theory

Kirton's Adaption-Innovation Theory (A-I Theory) is based on the idea that "problem solving is the key to life" (Kirton, 2003, p. 8). All humans are creative and must constantly adapt to the changes around them to survive, which in turn means that no human can experience no change. The cognitive function used to problem solve, during these changes, involves a human's ability to use their cognitive effect, cognitive affect, and cognitive resource to produce the appropriate product (Kirton, 2010).

Cognitive effect encompasses both cognitive style and cognitive level, which are separate entities (Kirton, 2010). Cognitive effect produces a cognitive process that results in one's behavior. The cognitive resource is all

of the learned information, including “knowledge, experience, skills, etc.” (Kirton, 2010, p.25). An individual’s needs, values, attitude, and belief make up their cognitive affect. The cognitive affect creates the motivation for problem solving and can be impacted by social or environmental influences. Cognitive level, cognitive resource, and cognitive affect can all impact each other, but cognitive style remains stable throughout one’s life (Kirton, 2003). This distinction between cognitive resource, affect, level and style is significant as many measures of “style” are not a pure measure of style (Coffield, Moseley, Hall, & Ecclestone, 2004). Because the KAI, the measure of problem-solving style corresponding with A-I theory, is a pure measure of style, we can identify when style may be contributing to the phenomena of study and when it does not.

A-I Theory focuses on one’s cognitive style, which is defined as, “the strategic, stable characteristic- the preferred way in which people respond to and seek to bring about change” (Kirton, 2003, p.43). One’s cognitive style is resistant to change. In contrast, cognitive level is an individual’s potential capacity, which may be changed through learning (Kirton, 2010). In A-I Theory, cognitive style places all individuals on a continuum ranging from highly adaptive to highly innovative based on their score on Kirton’s Adaption-Innovation (KAI) Inventory (Kirton, 1984). One’s cognitive style is non-pejorative as there is no better or ideal style to solve problems. Those that fall on the more adaptive side of the continuum prefer structure and produce few ideas within the paradigm. Those that are on the more innovative side of the continuum proliferate ideas and prefer less structure (Kirton, 2003). Kirton (2003) further explains simply that the more adaptive prefer to do things better and the more innovative prefer to do things different.

Kirton (2003) describes all individuals as agents of change denoted AC¹ based on the assumption that all humans are creative and solve problems. All individuals choose to deal with change based on their own benefits or hindrances for the specific change. When referring to someone as more adaptive or more innovative, it’s crucial to keep in mind that a comparison is more meaningful within one’s own group or team than with the general mean (Kirton, 2003). In the context of a group, someone that falls within a 20-point subset from the mean of the group is considered an AC². Someone outside of the 20-point subset is referred to as an AC³ and is outside of the group consensus (Kirton, 2003). AC³ must utilize coping behavior to interact with the group. It is important to note that one’s problem-solving style and presence as a change agent is stable, but their interaction as an AC² or AC³ will alter depending on the group they’re working with. AC³s often are not valued in the group because they prefer to solve the problem differently than the consensus group of AC²s (Kirton, 2003).

Every place on the continuum has its own strengths and weakness, but most individuals have the commonality of being unable to see each other’s point of view (Kirton, 1980). This inability is what Kirton (2003) refers to as Problem B. Problem A is the common goal of the group. However, many groups struggle to focus on Problem A due to Problem B, which is caused by inner group issues that arise from the failure to manage diversity within a heterogeneous group (Kirton, 2003). Problem B can occur in any heterogeneous group with a problem-solving gap larger than 20 points (Kirton, 2003). The problem-solving gap is the difference between two individual’s problem-solving styles on the continuum. Heterogeneous groups are predicted to be more successful during large-scale complex problem solving, but must work to overcome team dissonance to achieve this success (Buffington et al., 2002; Kirton, 2003).

Purpose & Objectives

The purpose of this study was to determine if there may be significant differences in how students evaluate peers’ performance while completing a cooperative learning project with respect to their preferred problem-solving style while completing a cooperative learning experience during Virginia Governor’s School for Agriculture (VGSA). The study was guided by the following objectives:

1. Describe the problem-solving styles of secondary students in VGSA.

2. Describe secondary students' perceptions of group members at the VGSA.
3. Examine the differences between secondary students as agents of change and their perceptions of group members.
4. Examine the differences between secondary students grouped by problem-solving style and their perceptions of group members.

Methods

The target population in this study consisted of all high school junior and seniors ($N = 100$) participating in a four week residential VGSA. A sample of 70 students, encompassing 14 teams of five, was used based on an entire team of five returning their permission to participate form. The student ages ranged from 16 to 18 years old and were accepted into the program based on an application process. These students were keyed gift and talented rising students from Virginia in the agricultural industry. The program incorporated student-centered teaching and a cooperative learning project to provide hands-on opportunities and agricultural literacy on the wide array of jobs within the agricultural industry.

This study utilized a quantitative, quasi-experimental design. Prior to the start of the program, participants were administered Kirton's Adaption-Innovation (KAI) Inventory. Utilizing the KAI scores, 20 groups of five students were created. Staying within a maximum of 25 point spread between all group members on the KAI continuum, 10 groups were created to serve as homogeneous groups with similar problem-solving styles. The remaining 10 groups were created as heterogeneous groups. The sample of 70 students were assigned into four homogenous groups and 10 heterogeneous groups.

After week one of the program, participants received their KAI feedback. The KAI Inventory is a 33-question measurement tool, which asks participants questions regarding their preferences in problem solving. The instrument is designed as a Likert-type scale ranging from very hard to very easy on a continuum. The theoretical scale of the KAI Inventory ranges from 32-160 with an observable range of 45-145 (Kirton, 2003). The general population approaches a normal curve distribution with a mean score of 95. Individuals who score a 95 or below are considered more adaptive and individuals who score a 96 or above are considered more innovative (Kirton, 2003). A variety of studies have established the reliability of the KAI Inventory with reliabilities ranging from .74 to .86 for adolescents (Kirton, 2003).

After week two, a peer evaluation form was given to participants of each group, which requested that the students rank their team members on performance. Students were asked to evaluate each team member based on the extent to which he/she participated and communicated, prepared, helped the group excel, and was a team player. The scale ranged from 4 – *Usually (over 90% of the time)*, 3 – *Frequently (more often than not)*, 2 – *Sometimes (less than half of the time)*, 1 – *Rarely (never or once in a great while)*. Participation and communication was described as the extent to which a team member articulates their ideas effectively, while listening and encouraging others. Preparation involved being on time for team meetings and having read and completed all prior assignments. Expressing interest in the group's success, initiating problem solving, influencing high standards for the group and staying motivated towards success were all factors in helping the group excel. A team player was described as someone who knows when to be a leader and a follower, keeps an open mind, compromises when appropriate, can take criticism, and shows respect for others. These four constructs were developed to examine cooperative learning elements within the teams. Based on the explanations, cooperative learning should be occurring if the elements are met consistently by a group.

Data Analysis

Descriptive statistics were utilized to describe Kirton's Adaption-Innovation Inventory (problem-solving style) scores and perceptions of group members. A participant's classification as an agent of change was determined by their distance on the continuum from their group's average KAI score. AC² being 10 points or less from the group's average KAI score and AC³ being more than 10 points from the group's average KAI score, respectively. Additionally, independent *t* tests were used to determine whether a difference existed between high school students as agents of change and their perceptions of group members and high school students grouped by problem-solving style and their perceptions of group members. The independent *t* test was used to demonstrate the significance of findings ($p < .05$).

Results

Objective one focused on describing the problem-solving styles of high school students in VGSA. Problem-solving style scores were determined from each participant's results on the KAI Inventory. The problem-solving scores for high school students participating in VGSA ranged from 53 to 123 on the continuum with a mean score of 90.80 points. The mean for problem-solving style ($M = 90.80$, $SD = 17.49$) was slightly lower than the general population average of 95 (Kirton, 2003).

Objective two concentrated on describing high school students' perceptions of group members during VGSA. To investigate participants' perceptions of group members, participants completed a peer evaluation for each member of their group. These evaluations utilized a four-point scale (4 – *Usually*, 3 – *Frequently*, 2 – *Sometimes*, 1 – *Rarely*) to determine how a group member contributed to the team, and theoretically, how often cooperative learning occurred. Each group member's average score was calculated for each construct. Each individual's average was utilized to find the descriptive statistics for the group. The peer evaluations demonstrated that the members frequently met the standards of the group in regards to cooperation ($M = 3.69$, $SD = .46$), helping the group to excel ($M = 3.60$, $SD = .42$), participation and communication ($M = 3.53$, $SD = .46$), and preparation ($M = 3.69$, $SD = .38$). In addition, overall peer evaluations scores ($M = 3.63$, $SD = .34$) indicated that group members frequently participated in cooperative learning (Table 1).

Table 1

Perceptions of Group Members based on Peer Evaluation Scores (n=70)

	<i>M</i>	<i>SD</i>
Overall Peer Evaluation Score	3.63	.34
Team Player (Cooperation)	3.69	.46
Helps Group Excel	3.60	.42
Participation & Communication	3.53	.46
Preparation	3.69	.38

Note: Scale: 1 = *Rarely*, 2 = *Sometimes*, 3 = *Frequently*, 4 = *Usually*

Objective three aimed to examine the differences between high school students as agents of change and their perceptions of group members. Participants were classified as agents of change in relation to their problem-solving scores distance on the continuum from their group's average KAI score. AC² ($n = 41$) were students that were 10 points or less from their group's average and AC³ ($n = 29$) students were those that were more than 10 points from their group's average, respectively. AC² were viewed as meeting expectations more often for being a team player ($M = 3.68$, $SD = .399$), helping the group excel ($M = 3.63$, $SD = .399$), and participating and communicating ($M = 3.55$, $SD = .408$). In addition, AC² received higher overall scores ($M = 3.63$, $SD = .310$).

AC³ were more frequently prepared ($M = 3.69, SD = .329$). However, there was no statistical difference between high school students as agents of change and their perceptions of group members (Table 2).

Table 2

Differences between High School Students as Agents of Change and their Perceptions by Group Members

	<u>N</u>	<u>M</u>	<u>SD</u>	<u>t</u>	<u>P</u>
<u>Overall Peer Evaluation Score</u>					
AC ²	41	3.63	.310	.275	.784
AC ³	29	3.61	.380		
<u>Team Player (Cooperation)</u>					
AC ²	41	3.68	.399	-.138	.891
AC ³	29	3.55	.459		
<u>Helps Group Excel</u>					
AC ²	41	3.63	.399	.739	.462
AC ³	29	3.55	.459		
<u>Participation & Communication</u>					
AC ²	41	3.55	.408	.493	.624
AC ³	29	3.50	.521		
<u>Preparation</u>					
AC ²	41	3.67	.422	-.228	.820
AC ³	29	3.69	.329		

Note. Significance at the * $p < .05$ and ** $p < .01$ level, 2-Tailed.

Objective four sought to examine the differences between high school students grouped by problem-solving style and their perceptions of group members. Homogenous groups ($n = 20$) were groups designed to have a 25 point spread or less on the KAI continuum. Additionally, control groups ($n = 50$) were created to observe differences between homogeneous and heterogeneous groups. Members of the homogenous groups received higher scores for being a team player ($M = 3.74, SD = .199$) and helping the group excel ($M = 3.61, SD = .111$). However, there was no significance observed for these two constructs. Homogenous teams also received higher overall peer evaluation scores ($M = 3.70, SD = .115, p = .019$) that were significant. Homogenous teams had higher scores for participation and communication ($M = 3.65, SD = .149, p = .001$) and preparation ($M = 3.80, SD = .130, p = .001$) were also found to be significant (Table 3).

Table 3

Differences between High School Students Grouped by Problem-Solving Style and their Perceptions by Group Members

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>P</i>
<u>Overall Peer Evaluation Score</u>					
Homogenous Groups	20	3.70	.115	2.41	.019*
Heterogeneous Groups	50	3.60	.183		
<u>Team Player (Cooperation)</u>					
Homogenous Groups	20	3.74	.199	1.28	.206
Heterogeneous Groups	50	3.59	.245		
<u>Helps Group Excel</u>					
Homogenous Groups	20	3.61	.111	.53	.600
Heterogeneous Groups	50	3.59	.245		
<u>Participation & Communication</u>					
Homogenous Groups	20	3.65	.149	3.39	.001**
Heterogeneous Groups	50	3.49	.249		
<u>Preparation</u>					
Homogenous Groups	20	3.80	.130	3.45	.001**
Heterogeneous Groups	50	3.64	.190		

Note. Significance at the * $p < .05$ and ** $p < .01$ level, 2-Tailed.

Conclusions

The findings for problem-solving styles among high school students in VGSA were consistent with previous literature demonstrating a mean that was slightly below the general population average, but still considered a similar score (Kirton, 2003). Similar scores are described as those with less than a 10 point differential on the adaption-innovation continuum. The range of scores 53-123 compared similarly to the theoretical range of 45-145 with a consistent slight right skew (Kirton, 2003). Based on the findings, it can be concluded that high school students in VGSA are comparable to the general population.

Cooperative learning occurs when students work together in a group to obtain knowledge and work towards a common goal within an educational context (Tsay & Brady, 2010). The results from the peer evaluations provide an indication that cooperative learning occurred frequently by meeting all five of the basic elements set in place in the pedagogy (Johnson & Johnson, 1989). Positive interdependence was viewed in relation with helping the group excel, where students worked together towards a common goal. By examining preparation, individual accountability was able to be detected by the standards one held themselves to. The face-to-face promotive interaction was observed through communication and participation by listening and encouraging others. In order to be considered a team player, individuals had to uphold social skills. Students in VGSA were expected to partake in group processing following completion of the peer evaluations. Overall, the peer evaluations indicated frequent positive interactions within a group, which supported the elements of the cooperative learning pedagogy.

Students as AC³s compared to AC²s in this program failed to show a statistically significant difference ($p > .05$) on their perceptions of each other. Since AC³ fall outside of the similar subset, it could be assumed that these students would experience more dissonance due to having to utilize coping behavior. This could indicate that all group members experience conflict in comparable measures, regardless of one's role as an agent of change. When considering that these students chose to apply for VGSA and were high achieving students, high motive may have played a role in the findings, which leads to coping outside one's preferred problem-solving style. Motive is defined as "the process by which energy is mobilized, gathered, and directed towards a goal" (Kirton, 2003, p. 93). Although coping behavior is still occurring, there is additional energy and leeway in discomfort due to working towards a common goal. The amount of motive impacts the amount of effort, duration of effort, and exertion towards achievement (Kirton, 2003). Since the participants were all looking to gain further knowledge and experiences through VGSA motive may have been higher than usual within this group.

In A-I Theory, heterogeneous groups are able to solve more complex problems by connecting a variety of styles and encompassing individuals outside of the consensus (Buffington et al., 2002; Kirton, 2003). However, consistent with previous literature the homogenous groups among high school students at VGSA had higher scores in all peer evaluations categories and statistically significant higher frequency in participation and communication, preparation, and their overall peer evaluation scores. A heterogeneous group has to manage the diversity of the problem and diversity of the problem-solvers (Kirton, 2003). Kirton (2003) explains that the group often focuses more on the issues between problem-solvers than the problem at hand. Based on the findings, it can be concluded that these secondary students in VGSA placed in homogeneous groups perceive their group members in higher regards.

Implications & Recommendations

Although the findings of this study are limited specifically to the population of high school students in VGSA and not generalizable to a larger group, there are still several implications and recommendations for future practice and research. These types of summer programs are able to engage adolescents in valuable experiences to better prepare them for the workforce. The literature on cooperative learning demonstrates how students are able to learn transferable skills, achieve higher levels of learning, and retain information for longer periods of time (Oakley et al., 2004). This study demonstrated an example of a cooperative learning activity, which was incorporated into a high school residential, agricultural summer program. It also provided implications that cooperative learning strategies should be utilized in other programs, where the instructor actively works to competently assign students to groups and promote positive interdependence, individual accountability, face-to-face promotive interaction, social skills, and group processing (Johnson & Johnson, 1989).

Further, these cooperative learning experiences should be utilized to educate students on how to collaborate with others and overcome team dissonance. Working in heterogeneous groups will always provide some form of discomfort to team members. However, it is essential for solving complex problems. Kirton (2003) suggested that self-actualization when related to one's problem solving does not help an individual learn how to cope, but does provide the individual with tools to judge when they are coping. Teaching these skill sets to high school students will maximize their cognitive function and contribute to their future success. The expanded skills in problem solving, communication, and team skills will provide high school students with the experiences needed to be successful within their future careers and in turn promote the expansion of the agricultural industry.

Based on the findings and a lack of research with agents of change in A-I Theory, further research should be conducted on how the individuals experience discord within a group. Theoretically, an agent of change outside of the subset of consensus should experience more disharmony and have to partake in coping behavior. However, this study may indicate that all individuals within a heterogeneous group experience coping behaviors

regardless of their role as an agent of change. Based on the factor of motive, this study was unable to make any conclusions related to this phenomenon, which calls for additional exploration.

Future research should be conducted to look at a larger sample size across multiple like programs with high school students interested in the agricultural industry. Additionally, qualitative methods should be utilized to receive a better understanding of perceptions of group members and their interactions. Discovering more about how adolescents utilize and perceive their own problem-solving style and the problem-solving styles of team members could provide further insight into the development of technologies for teaching problem-solving and a higher order of thinking within high school agricultural contexts and better preparing incoming professionals.

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Effects of the Order of Abstraction and Type of Reflection on Content Knowledge when Teaching Experientially in a High School Classroom

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Abstract

In classrooms today, teachers continue to strive to enhance student knowledge and application by designing learning environments which create experiences for students to interact collaboratively, solve problems, think critically, and learn by doing. Research has indicated that teacher knowledge of the experiential learning cycle has become increasingly important to assess what was learned. This exploratory study sought to determine the effect of reflection-in and reflection-on-action regarding content knowledge, the effect the order of abstraction had on content knowledge, and if any interaction existed between type of reflection and order of abstraction on content knowledge scores of secondary agriscience students. Utilizing a 2 x 2 randomized experimental design, research was conducted in a secondary agriscience classroom.

How order of abstraction and type of reflection are implemented were found to be significant in the development of discussion skills. Agriscience teachers should be made aware of the benefits on student learning outcomes when effective concrete experiences are designed for their students to engage, reflect, conceptualize, and experiment.

Introduction

Historically, the Hatch Act of 1887 provided momentum for the original agriscience programs. Liberty Hyde Bailey (1908) recognized the need for agricultural education teachers to have broad training in scientific concepts in order to teach a science-based curriculum (Hillison, 1996). In 1917, the Smith-Hughes Act shifted the emphasis from an academically, science-based curriculum to vocational training. Although the vocational components of the curricula were highlighted, the science in the field of agriculture remained (Hillison, 1996). Over time, emphasis in the field of agriculture has become progressively grounded in science and increasingly more technologically complex to meet the demands of the future (Hillison, 1996). Teaching science through agriculture where learning can be applied through concrete experiences has provided occasions to more effectively teach science (National Research Council, 1988). Nearly a century after the Smith-Hughes Act, teachers and schools are being continually pushed towards enhancing science, technology, engineering, and math (STEM) concepts in the learning environment. As the 21st century workplace continues to change, the need for students to be prepared to enter college or a career persists as an important discussion in all aspects of K-12 education, business, and industry (Carnevale, Smith, & Melton, 2011; Conley, 2014).

In classrooms today, teachers continue to strive to enhance student knowledge and application by designing learning environments which create experiences for students to interact collaboratively, solve problems, think critically, and learn by doing. Given the potential to increase learning by way of experience, more of these learning activities have become laboratory-based in scientific principles and methods (Abdulwahed & Nagy, 2009). These types of experiences can assist in preparing students to be academically and technically ready to pursue college and careers. Experiential learning has played a significant role in integrating STEM into the agricultural education program model (Baker, Brown, Blackburn, & Robinson, 2014).

School-based Agricultural Education (SBAE) programs are built with a strong foundation of curricular emphasis in relation to experiential learning (Baker, Robinson, & Kolb, 2012; Knobloch, 2003; Roberts, 2006; Zilbert & Leske, 1989). Despite the agreement that experiential learning has positive benefits, little has been reported in terms of how to successfully teach based on experiences (Baker et al., 2014). The three circle model

which includes, classroom and laboratory instruction, a supervised agricultural experience, and participation in the National FFA organization in the SBAE program provides a foundational setting for formal experiential learning activities to take place on a daily basis.

Many agriscience teachers have been unaware of the experiential learning cycle and have needed instruction to develop curricular plans (Arnold, Warner, & Osborne, 2006; Shoulders & Myers, 2013) that would guide students through a series of four events that include a concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984; Roberts, 2006). Formal experiential learning behaviors arise in classrooms and laboratories (Etling, 1993). Typically the Supervised Agricultural Experience Program (SAEP) has been recognized as the experiential learning component of a SBAE program. Research conducted by Arnold et al. (2006) questioned to what extent experiential learning was used by high school agriscience teachers. Findings indicated although experiential learning was being implemented, it was not always cyclical (Arnold et al., 2006). Research conducted by Baker et al. (2012) concluded experiential learning theory should be incorporated into each of the three components of a SBAE program.

As education has been reformed, the role of the teacher has changed from delivering information in a passive teacher-centered environment to facilitating learning in an active student-centered environment (Padron & Waxman, 1999). Research has indicated that teacher knowledge of the experiential learning cycle and how people learn has become increasingly important to assess what was learned (Arnold et al., 2006; Baker et al., 2014; Knobloch, 2003; Shoulders & Myers, 2013).

Baker, Robinson, and Kolb (2012) suggested the need to compare students who are engaged in a series of agricultural education experiences to those who experience similar concepts delivered in a lecture-based approach. Similarly, Baker et al. (2014) posited the need to train inservice and preservice teachers to be cognizant of reflection-in-action techniques. Shoulders & Myers (2013) cautioned that researchers also need to assess potential perceived barriers for teachers' incorporation of reflective or experimental activities. Arnold et al. (2006) indicated class enrollment, time, supervision, and management of student activities as potential challenges faced by teachers when utilizing the experiential learning model.

Although the teacher is challenged to manage student learning in a way that facilitates learning rather than simply introducing information, changed methods of instruction have provided opportunities for greater student achievement and academic success. Students have benefited through the development of higher order thinking skills, active engagement (Arnold et al., 2006), listening skills, problem-solving, creative thinking, self-esteem, and self-motivation (Leske & Zilbert, 1989) when they are exposed to experiential learning. These are all skills needed for students to be prepared for both college and career in the 21st century (Casner-Lotto, & Barrington 2006; Conley, 2005; Crawford, Lang, Fink, Dalton, & Fielitz, 2011; Stone & Lewis, 2012).

Theoretical and Conceptual Framework

To enhance learning, instructional methods should be focused on student engagement (Baker et al., 2012). When effectively designed, a concrete learning experience should be paramount for student engagement in the learning process. Engagement in a concrete experience should occur at the beginning of the learning process for optimal learning to occur (Phipps, Osborne, Dyer, & Ball, 2008). An examination of past perspectives has indicated that education through experience (Dewey, 1938) and learning by doing are key components to enhancing student learning outcomes.

Kolb's (1984) experiential learning theory (ELT) postulated the theoretical and conceptual framework for this study. Figure 1 provides the conceptual Model of the Experiential Learning Process (Kolb, 1984).

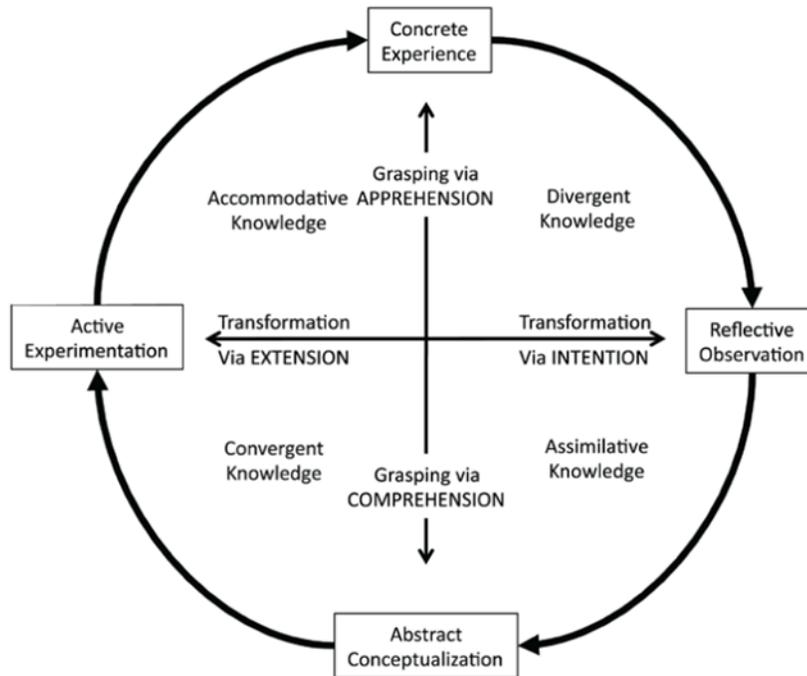


Figure 1. Model of Experiential Learning Process. Reprinted from *Experiential Learning: Experience as the Source of Learning and Development* (p. 42), by David A. Kolb, 1984, Englewood Cliffs, NJ: Prentice-Hall, Inc. Copyright 1984 by Prentice-Hall, Inc. Reprinted with permission.

Based on the major tenets of ELT, reflective observation along with abstract conceptualization were the major focus for this research. Reflection in-action is synchronous and occurs throughout the teaching process. This type of reflection aids the learner by providing opportunities for them to think about their decisions during the learning process (McAlpine & Weston, 2000). Asynchronous reflection or reflection in-action occurs after the learning activities have occurred. Overall, “reflection is a mechanism for the construction of knowledge from experience” and has resulted in assisting effective learning opportunities (McAlpine & Weston, 2000, p. 371). Collaborative, student-centered, learning environments that seek to explore real-world problems and provide opportunities for social experience tend to enhance reflective practices (Jonassen, Davidson, Collins, Campbell, & Haag, 1995). Meaningful and rigorously designed occasions for reflection encourage development of higher order thinking skills and can positively impact overall student achievement scores (Arnold, et al., 2006; Moon, 1999; Sobral, 2000).

During the abstract conceptualization stage, content is organized and comprehended by the learner (Roberts, 2006). The processing of interactions with the environment should occur in a way which support cognitive development, where students can make meaning from the experience (Kolb, 1984). Dale's Cone of Experience (1946) provided a model that distinguished between various levels of abstract to concrete experiences which can occur throughout the learning cycle. With respect to Dale's Cone of Experience (1946) in relation to abstract conceptualization, this research focused on whether or not the order of abstraction significantly impacted learning outcomes. The pre-abstraction treatment consisted of an abstract experience (a lecture with discussion) followed by a concrete experience (a laboratory experiment) and the post-abstraction consisted of a concrete experience (a laboratory experiment) followed by an abstract experience (a lecture with discussion).

According to Roberts (2006) experiential learning is a cyclical process, defined by the context in which it occurs, and involves an initial focus, an interaction with the phenomenon being studied, reflection on the experience, development of generalizations, and finally opportunities to test those generalizations. There are four dimensions required in order for experiential learning to occur contextually. The four required dimensions are: the level, the duration, the intended outcome, and the setting (Roberts, 2006).

Purpose and Objectives

Based on the recommendations of an exploratory study conducted by Baker et al. (2014), this study sought to determine the effect of reflection-in and reflection-on-action regarding content knowledge, the effect that the order of abstraction had on content knowledge, and if any significant interaction existed between type of reflection and order of abstraction on content knowledge scores of secondary agriscience students. The following objectives guided this study:

1. Describe the effect an interaction between order of abstraction and type of reflection has on content knowledge scores, calculation scores, and discussion scores;
2. Describe the variance in content knowledge, calculation, and discussion scores attributed to the order of abstraction;
3. Describe the variance in content knowledge, calculation, and discussion scores attributed to the type of reflection employed.

Methodology

Overall the design of this study was modeled by the Baker et al. (2014) study. The current investigation utilized a 2 x 2 randomized experimental design (Ary, Jacobs, & Sorensen, 2010). The population of interest was secondary agriscience students, defined as ninth through twelve grade pupils enrolled in a high school agritechology course. A suburban/rural interface area high school of approximately 1200 students was selected and agreed to participate in the study.

Students in the agricultural education program at the selected high school were randomly assigned to a treatment group for the class roster provided by the agricultural education instructor (See Figure 2). Further, all study materials were reviewed and approved by the university Institutional Review Board and parental consent was received from all student participants since the participants were minors. Proper research protocol to obtain permission to conduct research in the high school was followed and permission was granted by the school board.

	Reflection In-Action	Reflection On-Action
Pre-Abstraction	Treatment Group A	Treatment Group B
Post-Abstraction	Treatment Group C	Treatment Group D

Figure 2. 2 x 2 Randomized experimental design

Upon review of the teaching materials (lesson plans and assessments) used by Baker et al. (2014), it was determined that those materials were not appropriate for the high school population of the current study. Therefore, lesson plans, a PowerPoint presentation, and assessments were developed by the researchers and reviewed by content experts and were verified to contain appropriate content and teaching methods. This study did use the same Lab-Aids® biofuels investigation laboratory activity that focused on compared energy stored in two fuels, kerosene and ethanol. Some modifications were made to address the high school audience of this study as compared to the collegiate students in the Baker et al. (2014) study. In addition to the 20 question multiple choice pre-assessment, the post-assessment included data tables requiring participants to calculate

average temperature and mass, energy absorbed, average mass of fuel consumed, and average energy content of fuel. Four discussion questions related to the data collected and calculated were also included in the post-assessment. All of the data calculations and discussion questions were similar to the calculations and discussion reviewed in the laboratory settings of both the reflection in-action and reflection on-action treatment groups.

The treatment groups varied based on time of reflection (in-action vs. on-action) and time of abstraction (pre-laboratory activity vs. post-laboratory activity). The students in the pre-abstraction groups participated in a biofuels lecture/discussion that provided abstract concepts of biofuels, and then participated in an agriscience laboratory experience focusing on biofuels; comparing the energy stored in kerosene and ethanol. The students in the post-abstraction groups engaged in the biofuels agriscience laboratory experience first, followed by the biofuels lecture/discussion abstraction. The students in the reflection in-action groups were asked probing questions during the experimentation process in the laboratory portion to engage in reflection during the instruction. Reflection in-action time ranged from three to five minutes and occurred five times during the laboratory session. The students in the reflection on-action were asked probing questions after completing the laboratory experience to engage in reflection following instruction. Approximately 15 minutes was provided at the end of the laboratory session for the reflection on-action.

The school's agricultural education instructor delivered the lecture with discussion based on the lesson plans developed by the researchers while graduate students from the university with high school teaching experience delivered the laboratory experience. All agricultural education professionals that were selected to deliver the instruction did receive training on the content to be delivered. One of the researchers observed the lecture with discussion and laboratory delivery to ensure that the designed lesson plans were delivered as intended. All teaching sessions were found to adhere to the developed plan, thus fidelity of treatment was ensured. Each teaching session began with daily announcements and attendance procedures conducted by the school's agriscience instructor. These activities accounted for approximately five to seven minutes of the fifty minute class period.

The agricultural education instructor administered a content knowledge pre-assessment to the participants four days prior to treatment. The treatments were delivered during four consecutive days of instruction. The content knowledge post-assessment was administered by the agriscience instructor to the participants five days following the instruction. The post-assessment included mathematical calculations and discussion questions similar to those introduced in the laboratory experience. All assessments were scored and recorded in a spreadsheet by the university researchers.

Population

Replication of this study at the secondary level, introduced several limitations. Baker et al. (2014) indicated the need for a sample size of 76 participants to ensure a power base of .80 for a full-scale replication of this study. However, due to the constraints of conducting research within a high school classroom, of the 40 agriscience students enrolled in two agritechnology courses, the total sample size was 26 for a 65% response rate. The various treatment groups sample sizes ranged from 5 to 9. A complete report of the population and treatment groups is found in Table 1. Though the total group of participants was relatively balanced between male and female participants, some of the treatment groups had more variation. A majority of participants reported they had some prior experience with biofuels, and had a slightly positive rating of their overall learning experience during the biofuels lesson.

Table 1

Description of Population and Treatment Groups

	Total	Treatment Group A	Treatment Group B	Treatment Group C	Treatment Group D
<i>N</i>	26	6	9	5	6
Gender					
Male	54%	17%	89%	40%	67%
Female	46%	83%	11%	60%	33%
Age	<i>M</i> = 15.23 (<i>SD</i> = 1.03)	<i>M</i> = 15.33 (<i>SD</i> = 1.21)	<i>M</i> = 15.33 (<i>SD</i> = 1.12)	<i>M</i> = 15.00 (<i>SD</i> = 1.00)	<i>M</i> = 15.17 (<i>SD</i> = .98)
Prior Experience					
None	23%	33%	0%	40%	33%
Some	69%	67%	89%	20%	77%
A great deal	8%	0%	11%	40%	0%
Rating of Experience ^a	<i>M</i> = 6.23 (<i>SD</i> = 2.21)	<i>M</i> = 6.50 (<i>SD</i> = 1.76)	<i>M</i> = 7.11 (<i>SD</i> = 2.21)	<i>M</i> = 5.60 (<i>SD</i> = 2.79)	<i>M</i> = 5.17 (<i>SD</i> = 2.04)

Notes^a Means and standard deviations for the 10 point-rating scale of experience: 1 being totally disliked, 5 being neutral, 10 being totally liked

Findings

The findings have been organized into sections based on the three different components of the assessment: Knowledge test scores, calculation scores and discussion scores. Null hypotheses were created for the purposes of statistical analysis and are included in each of the following sections.

Knowledge Test Scores

H₀ 1: There is no variance in knowledge scores due to the interaction of order of abstraction and method of reflection

H₀ 2: There is no significant difference in the overall mean knowledge scores between the reflection in-action and the reflection-on-action.

H₀ 3: There is no significant difference in overall mean knowledge scores between the pre-abstraction and post-abstraction groups.

The means for the knowledge test scores related to reflection-in and reflection-on action were 51.33 (*SD* = 14.69), and 47.73 (*SD* = 14.38) respectively. Pre-abstraction group has a mean of 46.35 (*SD* = 12.45), and post abstraction has a mean of 52.86 (*SD* = 15.65). A complete report of descriptive statistics for the Knowledge Test Scores is found in Table 2. Levene's test of equality of error variance was used to ensure the assumption of equal variances was not violated, and it yielded $F(3,22) = 1.67, p = .20$. The ANOVA for the discussion assessment scores is summarized in Table 3. The interaction effect of reflection and abstraction yielded an $F(1,22) = .720, p = .40$, and the first null hypothesis failed to be rejected. Since no simple main effects were detected an analysis of main effects was necessary (Kirk, 1995). There was no significant main effect of the type of reflection, $F(1,22) = 1.64, p = .21$, or order of abstraction on the knowledge test scores $F(1,22) = .50, p = .49$, resulting in a failure to reject the second and third null hypotheses.

Table 2

Mean Knowledge Test Scores for Treatment Conditions of Type of Reflection and Order of Abstraction

Type of Reflection	Order of Abstraction	<i>M</i>	<i>SD</i>	<i>n</i>
Reflection In	Pre-Abstraction	53.33	11.25	6
	Post-Abstraction	50.00	17.14	9
	Total	51.33	14.69	15
Reflection On	Pre-Abstraction	41.00	9.61	5
	Post-Abstraction	53.33	16.02	6
	Total	47.73	14.38	11
Total	Pre-Abstraction	46.25	12.45	12
	Post-Abstraction	52.86	15.65	14
	Total	49.81	14.39	26

Table 3

Analysis of Variance Summary Table for Knowledge Test Scores

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P</i>
Reflection	346.76	1	346.76	1.64	.21
Abstraction	105.11	1	105.11	.50	.49
Reflection*Abstraction	152.39	1	152.39	.720	.40
Error	4653.33	22	211.51		
Total	5174.04	25			

$p < .05$

Calculation Scores

H₀ 4: There is no variance in calculation scores due to the interaction of order of abstraction and method of reflection

H₀ 5: There is no significant difference in the overall mean calculation scores between the reflection in-action and the reflection-on-action.

H₀ 6: There is no significant difference in overall mean calculation scores between the pre-abstraction and post-abstraction groups.

The means for the calculation scores related to reflection-in and reflection-on action were 43.80 (SD = 30.00), and 45.73 (SD = 31.96) respectively. Pre-abstraction group has a mean of 39.75 (SD = 31.38), and post abstraction has a mean of 48.79 (SD = 29.74). A complete report of descriptive statistics for the Calculation Scores is found in Table 4. Levene's test of equality of error variance was used to ensure the assumption of equal variances was not violated, and it yielded $F(3,22) = .104, p = .96$. The ANOVA for the discussion assessment scores is summarized in Table 5. The interaction effect of reflection and abstraction yielded an $F(1,22) = 1.35, p = 2.58$, and the fourth null hypothesis failed to be rejected. Since no simple main effects were detected an analysis of main effects was necessary (Kirk, 1995). There was no significant main effect of the

type of reflection, $F(1,22) = .003, p = .96$, or order of abstraction on the calculation scores $F(1,22) = .83, p = .37$, resulting in a failure to reject the fifth and sixth null hypotheses.

Table 4

Mean Calculation Scores for Treatment Conditions of Type of Reflection and Order of Abstraction

Type of Reflection	Order of Abstraction	<i>M</i>	<i>SD</i>	<i>n</i>
Reflection In	Pre-Abstraction	53.00	29.86	6
	Post-Abstraction	37.67	30.24	9
	Total	43.80	30.00	15
Reflection On	Pre-Abstraction	31.80	29.26	5
	Post-Abstraction	57.33	31.66	6
	Total	45.73	31.96	11
Total	Pre-Abstraction	39.75	31.38	12
	Post-Abstraction	48.79	29.74	14
	Total	44.62	30.24	26

Table 5

Analysis of Variance Summary Table for Calculation Scores

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P</i>
Reflection	2.79	1	2.79	.003	.957
Abstraction	796.41	1	796.41	.833	.371
Reflection*Abstraction	1287.91	1	1287.91	1.348	2.58
Error	21025.72	22	955.72		
Total	22862	25			

$p < .05$

Discussion Scores

H₀ 7: There is no variance in discussion scores due to the interaction of order of abstraction and method of reflection

H₀ 8: There is no significant difference in the overall mean discussion scores between the reflection in-action and the reflection-on-action.

H₀ 9: There is no significant difference in overall mean discussion scores between the pre-abstraction and post-abstraction groups.

The means for the discussion scores related to reflection-in and reflection-on action were 48.20 (SD = 23.92), and 50.45 (SD = 22.25) respectively. Pre-abstraction group has a mean of 52.92 (SD = 22.81), and post abstraction has a mean of 45.93 (SD = 23.20). A complete report of descriptive statistics for the discussion scores is found in Table 6. Levene's test of equality of error variance was used to ensure the assumption of equal variances was not violated, and it yielded $F(3,22) = .221, p = .88$. The ANOVA for the discussion assessment scores is summarized in Table 7. The interaction effect of reflection and abstraction yielded an

$F(1,22) = 12.17, p = .002$, and was determined to be significant. Accordingly, the seventh null hypothesis was rejected. There was also a significant main effect between the types of reflection, $F(1,22) = .14, p = .002$, resulting in the rejection of the eighth hypothesis. There was no significant main effect of order of abstraction on the knowledge test scores $F(1,22) = .50, p = .49$, resulting in a failure to reject the ninth and final null hypothesis.

Table 6

Mean Knowledge Discussion Scores for Treatment Conditions of Type of Reflection and Order of Abstraction

Type of Reflection	Order of Abstraction	<i>M</i>	<i>SD</i>	<i>n</i>
Reflection In	Pre-Abstraction	70.50	9.62	6
	Post-Abstraction	33.33	18.10	9
	Total	48.20	23.92	15
Reflection On	Pre-Abstraction	37.40	18.87	5
	Post-Abstraction	61.33	19.81	6
	Total	50.45	22.25	11
Total	Pre-Abstraction	52.92	22.81	12
	Post-Abstraction	45.93	23.20	14
	Total	49.15	22.84	26

Table 7

Analysis of Variance Summary Table for Discussion Scores

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P</i>
Reflection	51.05	1	51.05	.137	.002
Abstraction	.202	1	.202	.001	.982
Reflection*Abstraction	4520.705	1	4520.705	12.173	.002
Error	75860.00	22			
Total	13041.385	25			

$p < .05$

Conclusions

The lack of simple main effects on the first sections of the assessment indicate that type of reflection and order of abstraction are independent of each other when analyzing knowledge acquisition and calculation skills. However, the significance of the interaction on the discussion assessment indicates that how the order of abstraction and type of reflection are implemented are significant in the development of discussion skills. This conclusion is consistent with previous research indicating meaningful and rigorous reflection can result in developing higher order thinking skills and achievement gains (Arnold, et al, 2006; Jonassen et al., 1995; Moon, 1999; Sobral, 2000).

In terms of students discussion assessment scores, participants who were asked to reflect-in-action demonstrated significant statistical gains ($p=.002$). These results indicate that the mode of reflecting is important if discussion abilities are the primary learning objective. This finding confirms the notion that teachers must be present and engaged throughout a learning experience (Baker & Robinson, 2010; Baker et al., 2014). Though it should be

noted that previous research (Baker et al., 2014) found that the type of reflection can impact significant gains in knowledge scores, which differs from the findings of this study.

As suggested by Phipps et al. (2006) and Dale's Cone of Experience (1946), when a concrete experience occurs at the beginning of the learning process, student learning outcomes are optimized. Although some of the findings of this research were not statistically significant, as a follow-up, exploratory study it is encouraging to observe an opportunity to conduct a completely randomized factorial 2 x 2 design in a secondary agriscience classroom. During a time when preparing students to be college and career ready is a major focus in education, increased incorporation of experiential learning throughout the agricultural education curricula to encourage better discussion can serve as an important method for providing opportunities for students to connect what they are learning in the classroom to experience and real world application. Development of higher order thinking skills will assist in preparing students to think critically and solve problems.

Implications and Discussion

Agriscience teachers are continually asked to do more with less. Standards-based education, Federal and State mandated accountability systems for teachers and students, STEM integration, curricular updates, differentiated instruction, interdisciplinary education, and college and career readiness are consistently occurring in current educational discussions in the media, and in faculty meetings. ELT is just one example of research-based instructional methodology that agriscience teachers and their students would benefit from understanding and implementing in their classrooms.

If we know that the educator plays a vital role at each stage of the learning process (Baker, et al., 2014), and the principle reason ELT is not effectively implemented is due to the missing connection between the teacher and the experience (Baker et al., 2012), then how can we, as a profession of agricultural educators, work to better support the needs of our current agriscience teachers to better prepare them during preservice instruction, decrease their work load, provide necessary resources, and assure they utilize research-based practices to enhance student learning outcomes in their classrooms? In the undergraduate agricultural teacher education program, is there a need to evaluate the current curricular components to assure preservice teachers are provided with the theory and practice to possess the self-efficacy required to confidently implement effective instructional methods that are based on the tenets of ELT? Supervised Agricultural Experience Programs (SAEP) are consistently labeled as the experiential learning components in SBAE programs (Newcomb, McCracken, Warmbrod, & Whittington, 2004). Perhaps, agriscience teachers are unaware of the daily opportunities to incorporate experiential learning into the classroom and laboratory and in agreement with Baker, et al. (2012) should be encouraged to utilize ELT in all components of the three-circle model.

Recommendations for Practice

Agriscience teachers should be made aware of the benefits on student learning outcomes when effective concrete experiences are designed for their students to engage, reflect, conceptualize, and experiment. High quality professional development models should be designed to assist preservice and inservice agriscience teachers to develop curricular activities that effectively utilize and reinforce the tenets of ELT. This recommendation is also supported by previous research (Arnold et al., 2006; Baker, et al., 2014; Dewey, 1938; Knobloch, 2003; Shoulders & Myers, 2013).

Recommendations for Research

Baker et al. (2014) indicated the need for a sample size of 76 participants to ensure a power base of .80 with a full-scale replication of this study. As indicated by this research, a limitation to the generalizability in the

replication of this exploratory study, at the secondary level, was the sample size. Therefore, it is recommended this study be replicated in secondary agriscience classrooms where student enrollment is higher than 20 per class. In the typical secondary classroom, students are removed for various school functions and appointments, and are frequently absent from individual classes for the entire school day. Larger class sizes may assist in gaining the power required for generalizability of future findings.

Given the need for additional time for the reflection on-action experience treatment group, it is recommended that this study be replicated in secondary agriscience classrooms with block scheduling. The fifty-minute class period utilized in this study limited the number of experimental trials and the amount of time allocated for student discussion and therefore, the overall reflection time for the participants in the reflection on-action experience groups was also limited. Maximizing opportunities for meaningful reflection (Sobral, 2000), thus the amount of discussion time, may positively impact discussion scores.

Considerations and adaptations should be made for the delivery of the lecture portion of the lesson when block schedules are used. The content of the lecture should be adapted to better align with the post assessment. Incorporation of mathematical calculations in the lecture may assist in increasing post assessment calculation scores.

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The Effect of Pedagogy on Students' Long-term Retention of Knowledge

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Abstract

The purpose of the study was to determine the effect of two contrasting pedagogies (i.e., experiential learning and direct instruction) on students' retention of agricultural knowledge over time. A six-week deferred posttest was employed to assess long-term retention of the subject matter. The results indicated that initially, students who were taught both experientially and through direct instruction experienced a statistically significant increase in analytical scores, with the direct instruction treatment group outperforming the experiential learning treatment group. However, that increase was not statistically significant but was followed by a statistically significant decrease in analytical scores six weeks following instruction. Implications exist for preparing instructors to pace their lessons in a slower fashion to increase understanding and mastery of the content learned.

Introduction

A common goal of all educators is to increase the long-term knowledge retention of learners (Halpern & Hakel, 2002). However, "students ordinarily and regularly forget what they have learned in their classes" (Shulman, 1999, p. 13). In fact, most knowledge students seemingly have mastered, as evidenced by their performance on a final examination, is not retained or sustained over time (Bacon & Stewart, 2006). Numerous reasons exist for the vast amount of learning loss from students. Chief among them is students' use of cramming, which has shown "significant negative impact[s]" of retention over delayed periods of time involving long-term memory (McIntyre & Munson, 2008, p. 11). Although students admit that cramming does not lead to long-term retention, they continue the practice because the system has rewarded them for remembering and recalling information on demand (McIntyre & Munson, 2008).

It has been recommended that teachers discourage students from cramming by employing pedagogies that require a "deeper level of learning" (McIntyre & Munson, 2008, p. 11). The pedagogical approach that instructors choose to employ in the classroom has implications for increasing students' deep learning memories over time (Bacon & Stewart, 2006). Miller, McNear, and Metz (2013) suggested that one way to increase students' long-term retention of the subject matter is through the use of active and engaging pedagogies. Semb and Ellis (1994) echoed this claim by stating that instructors can positively impact the long-term retention of learning in their students if they will allow them numerous opportunities to apply their learning through higher order cognitive activities.

To accommodate deeper learning of students, McIntyre and Munson (2008) recommended that teachers slow down their pace of teaching and delivery of content so that students have adequate time to process new information. In addition, Weinstein and Mayer (1983) advocated for teachers to utilize elaboration, rehearsal, and organizational strategies for students, such as highlighting and underlining text, paraphrasing content, summarizing key points, and checking for understanding. McIntyre and Munson (2008) stated,

For long-term retention, students need to engage with the study material and apply it to situations of relevance to them. The all-too-common use of PowerPoint slide lectures, even with in-class handouts of the slides, does not engage students to take notes in their own language and handwriting, which shunts their processing of the material, leaving all effective learning to the cramming period at the end of the term. (p. 12)

In agricultural education, being able to retain knowledge *in* and *about* agriculture has been a focus since the late 1980s, when the profession set its sights on improving individuals' agricultural literacy (National Research Council, 1988) due to society being "ignorant about agriculture" (Blackburn, 1999, p. 1). Understanding more about how various pedagogies affect students' ability to remember agricultural content is imperative for sustaining the world's growing population. Therefore, it is vital that educators determine the best way to teach and distribute agricultural information to students for optimal long-term retention (Frick, Birkenholz, & Machtmes, 1995; Pense & Leising, 2004).

This study was undergirded by the information processing theory of retrieval and forgetting. The tenants of information processing include the systems of memory and how people process and bank information into and recall it from their short-term and long-term memory faculties. The way people process new content in their mind affects their ability to recall that information later (Schunk, 2012). When learning new information, people associate it with something they know already, a process known as encoding, so that it can be retrieved at a later date (Schunk, 2012). The implications for helping people encode information are important because that which is stored in short-term memory lasts for only seconds while information stored in long-term memory can be recalled weeks after the learning occurred (Bacon & Stewart, 2006, p. 181).

Individuals develop schema when learning new information (Korthagen & Kessels, 1999), which leads to stronger memory networks. "How and when students experience particular 'episodes' or events, or process specific details, appears to affect the schematization process and the long-term retention of conceptual knowledge" (Herbert & Burt, 2004, p. 79). As a result, learning is more sustained over time when individuals get to experience new content through concrete experiences (Korthagen & Kessels, 1999). In addition, instructors can assist students in recalling information by increasing the content's "meaningfulness, elaboration, and organization" (Schunk, 2012, p. 201). Unfortunately, "the act of remembering can prompt temporary forgetting" (MacLeod & Macrae, 2001, p. 148).

People forget information due to three main factors: a lack of cue-dependency, decay, and interference (Santrock, 2004). Cue-dependency involves a lack of retrieval cues necessary to remember the content in its original form (Nairne, 1990). "The process of decay involves the spontaneous loss of a memory; knowledge once stored actually disappears entirely from memory" (Bacon & Stewart, 2006, p. 182). Interference theory posits that people do not actually lose their memories; rather, other information gets in the way of old, stored learning and interferes with the ability to retrieve it when needed (Bacon & Stewart, 2006; Santrock, 2004). Such is the case when instructors test students on new material long after the learning has occurred (MacLeod & Macrae, 2001).

Various pedagogies can affect the amount of knowledge students retain or forget (Thalheimer, 2010). Although lectures are effective with recognition test, they tend to work poorly for long-term understanding (Halpern & Hakel, 2010). One pedagogy that provides authentic learning situations for students in classrooms and holds promise for long-term retention is experiential learning (Clark, Threeton, & Ewing, 2010). Historically, agricultural education has prided itself as a symbol of experiential learning (Baker, Robinson, & Kolb, 2012; Knobloch, 2003; Phipps, Osborne, Dyer, & Ball, 2008; Roberts, 2006). However, a dearth of information in the literature exists regarding the effects of experiential learning on students' long-term retention of the material. Because teaching affects learning, instructors need to know which pedagogies yield the best results for long-term learning (Kiewra, 2002). Specifically, Clark et al. (2010) called for the evaluation of how experiential learning impacts students' knowledge of retention by stating, "further research into how experiential learning is aligned with other learning research will provide the profession a better understanding of why experiential learning offers a sound opportunity to improve student retention and provide students with richer experiences" (p. 58).

Kolb (1984) stated that experiential learning is that which is grasped and transformed by the learner. Experiences that are grasped via apprehension and transformed via intention result in *divergent* knowledge. Experiences that are grasped via comprehension and transformed via intention result in *assimilative* knowledge. Experiences that are grasped via comprehension and transformed via extension create *convergent* knowledge. Finally, experiences that are grasped through extension and transformed via apprehension result in *accommodative* knowledge (Kolb, 1984).

In comparison to experiential learning, direct instruction could be considered its polar opposite. Direct instruction has been the most widely used pedagogy in schools (Begeny & Martens, 2006). It allows for the quick and efficient transfer of information from the teacher to the student in a straightforward manner (Watkins & Slocum, 2003).

Since its inception, agricultural education has focused on providing students with deep, rich experiences to adjust to a constantly changing world (Fitzgerald, 1936). Because the retention of agricultural knowledge is crucial to the world's success, it is important to know which pedagogy most impacts students' long-term retention.

Purpose of the Study

The purpose of the study was to determine the effect of two contrasting pedagogies (i.e., experiential learning and direct instruction) on students' retention of agricultural knowledge over time. This goal aligns with Priority 4 of the National Research Agenda of the American Association of Agricultural Education (Doerfert, 2011). Specifically, it seeks to "deepen our understanding of effective teaching and learning processes in all agricultural education environments" (p. 9) and assess the learning outcomes that result from techniques inherent to agricultural education. The research question that guided the study was: Do the analytical effects achieved by experiential and direct instructional approaches persist over time? The two null hypotheses created for this research question were as follows:

H₀ 1: There is no difference in the pre-test, post-test, and deferred post-test scores for students taught with the experiential approach.

H₀ 2: There is no difference in the pre-test, post-test, and deferred post-test scores for students taught with the direct instruction approach.

Methods

The population for this experimental design study included all students ($N = 120$) who were enrolled in a local, rural secondary agricultural education program in Oklahoma. This two-teacher program was chosen for this study because it is perceived as a *typical* and *holistic* program in Oklahoma. Further, its geographic proximity to Oklahoma State University made it accessible to the teachers, students, and researchers. In all, 80 students agreed to participate in the study by completing the necessary IRB documents for consent and assent. To initiate the study, the two teachers bussed the students to an off-site location in [City] where they were welcomed, checked in, and assigned to a treatment room (i.e., experiential learning or direct instruction). Thirty-eight students were assigned to the experiential learning treatment and 42 were assigned to the direct instruction treatment. The experiential learning treatment group consisted of 15 males (39%) and 23 females (61%). The direct instruction treatment group consisted of 23 males (55%) and 19 females (45%). Equal representation existed in both treatment groups regarding school grade, with the highest frequencies being freshmen ($n = 35$; 44%) and juniors ($n = 20$; 25%).

Because “no analysis, no matter how sophisticated, can compensate for poor data collection and measurement” (Stevens, 2009, p. 38), the researchers gave careful attention to the polarization of the treatments (Kirk, 1995). Specifically, two Oklahoma State University faculty members were assigned to deliver the curriculum to each respective treatment group. Although both had degrees in teacher education and worked at the university to prepare secondary teachers, they each received additional, explicit training regarding the study’s content and pedagogy necessary to teach it effectively while staying true to the method being featured. Also, because both the direct instruction and experiential learning pedagogies require instructors to provide instant feedback, guidance, and support to students, four additional instructors were used per room to ensure fidelity and potency of the treatment. These instructors were pre-service agricultural education students at Oklahoma State University who were engaged in learning about specific pedagogies in their college curriculum. Each instructor received four hours of training in the treatment area he or she was assigned regarding the pedagogical delivery of the content taught.

Specifically, the content taught was a unit on wind turbines. The content was chosen because it fit into an existing career pathway in agricultural education, has implications for potential careers for students, and is becoming a popular energy source in Oklahoma State. Further, the content had not been taught previously by the two teachers, thus, making it novel and fresh for the students and assuring that the findings would be authentic and not contaminated by previous learning or exposure.

On arrival to the site, students were escorted to their assigned treatment room. There, they completed an analytical pre-test regarding their knowledge of the curriculum. Once every student had completed the pre-test, the daylong workshop began. The major goal of the study was for students to construct a wind turbine, complete with blade design, which would produce the most amount of energy output possible. Throughout the day, each treatment group participated in various activities relevant to their assigned pedagogy. For instance, the experiential learning instructional room was set up with six different stations that allowed students to interact regarding key concepts of blade design. Students were allowed to experiment with building different blade designs and then reflect on various aspects of the process by completing abstract facilitation sheets while using products such as cups, plates, and paper. Throughout the day, students in the experiential learning treatment room walked around the room, interacted with the various stations, and designed and tested a number of different blade designs.

In contrast, the direct instruction treatment group received three distinct lessons targeting specific learning objectives related to wind energy. The instruction was scripted on a lesson plan where the instructor shared a PowerPoint presentation and specific information related to building wind turbines. True to the method, the instructor offered praise and rewards where appropriate. Specific KidWind® materials were used to demonstrate key principles. Students remained seated at their tables throughout the day working to master the objectives of the lesson.

Once students created their blade, they brought them to a measurement station to be assessed. These stations were standardized to ensure that each turbine in both conditions was measured consistently. This included the distance at which the turbines were placed from the fan, the speed of the fan, and the height of the wind turbine. Each blade design was connected to a Basic Wind Turbine KidWind® base that included a small generator connected to the hub. Using a voltage meter, the voltage reading of each blade design was recorded as a practical measurement.

The specificity of detail regarding the designing of blades was important because it offered experiences necessary for the instructional unit. In addition, it created episodic and procedural memories consistent with the information processing theory (Schunk, 2012). This attention to detail was necessary to determine the amount of learning sustained over time, in this case a six-week deferred post-test.

In the often cited Specht and Sandlin (1991) study, retention of knowledge was defined as six weeks following instruction. Therefore, this study employed a deferred analytical post-test to participants six weeks after the treatment ended. This assessment was administered in the secondary school setting by the agricultural education instructors.

A criterion-referenced test (CRT) based on the selected educational objectives of the blade design instructional unit served as the main analytical assessment for the study. The CRT was created as a collaborative effort by the researcher, KidWind® staff and consultants, experts in the field of wind energy engineering, and pedagogical experts in agricultural education. The purpose of the CRT was to capture students' ability to analyze, critique, judge, compare and contrast, evaluate, and assess concepts related to the objectives of the lesson. The CRT included 40 total questions, of which 30 were multiple-choice and ten were matching. The CRT was utilized for two purposes: (1) to determine that no statistically significant differences in analytical knowledge of blade design content existed prior to the experiment, and (2) as the first of three repeated measures in the SPF-2³ ANOVA.

Creswell (2008) explained that, "content validity is the extent to which the questions on the instrument and the scores from these questions are representative of all the possible questions that a researcher could ask about the content or skills" (p. 172). Further, Creswell (2008) suggested that researchers should establish both face and content validity on instruments through the review of the assessment by a panel of experts. Therefore, experts from KidWind® assessed the CRT for content validity, suggested changes, and approved the final set of 40 questions. Suggestions included the deletion of two ambiguous questions, insertion of four discriminating items, three content-related mistakes, and a few typographical errors. Pedagogical experts assessed the CRT for face validity and found it appropriate for secondary agricultural education students.

In addition to issues of validity, reliability refers to the extent that the scores made by an individual remain nearly the same in repeated measurements (Ary, Jacobs, & Razavieh, 2002). Wiersma and Jurs (1990) suggested eight specific methods to increase the reliability of criterion-referenced examinations, including homogenous items, discriminating items, enough items, high quality copying and format, clear directions for the students, a controlled setting, motivating introduction, and clear directions for the scorer. Each of these suggestions were considered carefully and addressed fully in the development of the CRT used for this study.

The role of reliability indices in criterion-reference examinations has been described adequately in the literature (Kane, 1986; Lang, 1982; Popham & Husek, 1969; Wiersma & Jurs, 1990). Although traditional reliability indices based on internal consistency are not relevant, it is an important indication of reliability in criterion-referenced exams (Kane, 1986). Kane (1986) purported that a reliability coefficient less than .50 would not provide reliable results. The Kuder-Richardson 20 (*KR20*) formula (Cronbach, 1970), a test for internal consistency used commonly with criterion-referenced exams, was used to determine the test's reliability. The CRT included the same questions and answers over the three periods of time (pre-test, post-test, deferred post-test). However, the order of questions and answers were altered to prevent students from memorizing the answers or becoming conditioned to the questions. Reliability coefficients (*KR20*) for each of the three tests were as follows: (a) .82 for the pre-test, (b) .90 for the post-test, and (c) .88 for the deferred post-test. Thus, it was determined that the CRT used in this study was a reliable measure of students' analytical knowledge.

A SPF-2³ repeated measure MANOVA design was employed to analyze the data. Stevens (2009) shared that repeated measures "are the natural design to use when the concern is with performance trends over time" (p. 413). Assumptions of normality and independence of observations were met. Mauchly's test of sphericity produced a *p* value of .30, making the assumption tenable. Since no simple main effects were found, the main

effects using univariate analysis of variance was assessed. Levene's test produced p values of .13, .07, and .96 for the pre-, post-, and deferred post-tests, respectively.

Findings

The study's research question sought to examine if analytical effects achieved by experiential and direct instructional approaches persisted over time. Prior to the conduction of the study, the pre-test was administered as both one of three repeated measures and a pre-test assessment of pre-existing differences in analytical content knowledge related to blade design. Table 1 presents the findings of a one-way ANOVA that found no statistically significant differences in the analytical knowledge of blade design prior the experiment, $F(1, 78) = 1.28, p = .26$. Thus, it was assumed that the groups were similar in their analytical knowledge entering the experiment.

Table 1

Comparison of Pre-Test Analytical Scores: An ANOVA Summary Table

Source of Variance	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Group	62.11	1	62.11	1.28	.26
Error	3795.10	78	48.66		
Total	3857.2	79			

All analytical scores, including each of the repeated measures, utilized the criterion-referenced exam, built around the blade design learning objectives. The test included forty multiple choice and matching questions that added to a total possible score of 40. The scores ranged from 4 to 32 points coordinating with a typical school grade of 10% and 80%, respectively. The experiential learning treatment group means were 15.35 (5.59) for a learning preference of grasping via apprehension, 15.75 (6.94) for a learning preference of grasping via comprehension, 15.67 (5.15) for a learning preference of transforming via extension, and 15.14 (7.35) for a learning preference of transforming via intention (see Table 2). The direct instruction group means were 16.55 (7.32) for a learning preference of grasping via apprehension, 19.18 (9.04) for a learning preference of grasping via comprehension, 17.45 (7.94) for a learning preference of transforming via extension, and 16.77 (7.72) for a learning preference of transforming via intention

Table 2

Analytical Pre-Test Means and Standard Deviations

		Experiential Learning		Direct Instruction	
		<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>
Grasping via	Apprehension	26	15.35 (5.59)	31	16.55 (7.32)
	Comprehension	12	15.75 (6.94)	11	19.18 (9.04)
Transforming via	Extension	24	15.67 (5.15)	29	17.45 (7.94)
	Intention	14	15.14 (7.35)	13	16.77 (7.72)
Treatment	Total	38	15.47 (5.96)	42	17.24 (7.78)

Analytical post-test scores were assessed using the same criterion-referenced exam as the pre-test with slight question and response order changes. The test included forty multiple choice and matching questions that added to a total possible score of 40. The scores ranged from 7 to 37 points, coordinating with a typical school grade of 18% and 93%, respectively. The experiential learning treatment group means were 24.15 (7.80) for a learning preference of grasping via apprehension, 25.42 (9.89) for a learning preference of grasping via comprehension, 26.75 (8.35) for a learning preference of transforming via extension, and 20.79 (7.29) for a learning preference of transforming via intention (see Table 3). The direct instruction comparison group means were 29.07 (6.30) for a learning preference of grasping via apprehension, 29.18 (8.32) for a learning preference of grasping via comprehension, 28.69 (7.47) for a learning preference of transforming via extension, and 30.00 (7.87) for a learning preference of transforming via intention.

Table 3

Analytical Post-Test Score Means and Standard Deviations

		Experiential Learning		Direct Instruction	
		<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>
Grasping via	Apprehension	26	24.15 (7.80)	31	29.07 (6.30)
	Comprehension	12	25.42 (9.89)	11	29.18 (8.32)
Transforming via	Extension	24	26.75 (8.35)	29	28.69 (7.47)
	Intention	14	20.79 (7.29)	13	30.00 (7.87)
Treatment	Total	38	24.55 (8.40)	42	29.10 (6.76)

Analytical deferred post-test scores ranged from 6 to 34 points, coordinating with a typical school grade of 15% and 85%, respectively. The experiential learning treatment group means were 17.12 (8.82) for a learning preference of grasping via apprehension, 20.00 (7.07) for a learning preference of grasping via comprehension, 18.00 (8.19) for a learning preference of transforming via extension, and 18.11 (8.89) for a learning preference of transforming via intention (see Table 4). The direct instruction comparison group means were 17.57 (8.53) for a learning preference of grasping via apprehension, 22.20 (7.66) for a learning preference of grasping via comprehension, 18.85 (10.58) for a learning preference of transforming via extension, and 18.64 (7.15) for a learning preference of transforming via intention.

Table 4

Analytical Deferred Post-Test Score Means and Standard Deviations

		Experiential Learning		Direct Instruction	
		<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>
Grasping via	Apprehension	17	17.12 (8.82)	28	17.57 (8.53)
	Comprehension	8	20.00 (7.07)	10	22.20 (7.66)
Transforming via	Extension	16	18.00 (8.19)	27	18.85 (10.58)
	Intention	9	18.11 (8.89)	11	18.64 (7.15)
Treatment	Total	25	18.04 (8.26)	38	18.79 (8.46)

The MANOVA (see Table 5) for the repeated measure design and indicated that there were no significant simple main effects, $\Lambda = .98$, $F(2,60) = .56$, $p = .58$. Attention then turned to main effects of which statistically significant differences were found, $\Lambda = .25$, $F(3,76) = 88.13$, $p = .00$.

Table 5

Summary of MANOVA Analyses Testing for Both Simple Main and Main Effects of the Deferred Analytical Repeated Measures (df = 60)

Source of Variance	Λ	<i>F</i>	<i>p</i>	Power
Time x Group	.98	.56	.58	.02
Time	.25	88.13	.00	.75

Contrasts revealed that there were statistically significant differences between the three repeated analytical measures, $F(2,122) = 86.01$, $p = .00$, $\eta_p^2 = .59$, with a large practical effect (see Table 6). Table 7 further clarified those differences in identifying statistically significant differences between the pre- and post-test, $F(1,61) = 172.84$, $p = .00$, $\eta_p^2 = .74$, as well as a statistically significant difference between the post- and deferred post-tests, $F(1,61) = 87.36$, $p = .00$, $\eta_p^2 = .59$.

Table 6

Comparative Analysis of Student Analytical Knowledge by Treatment Group: A Split-Plot Factorial 2.3 Repeated Measures ANOVA Summary Table (n = 63)

Source of Variance	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η_p^2
Repeated Measure Effects						
Time	4086.63	2	2043.32	86.01	.00	.59
Error	2898.47	122	23.76			
Between Subjects Effects						
Group	31.33	1	31.33	.68	.41	.01
Error	2826.22	61	46.33			

Table 7

Repeated Measure Analytical Repeated Design Within-Subjects Contrasts

Source of Variance	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η_p^2
Time						
Level 1 vs. Level 2	7108.30	1	7108.30	172.84	.00	.74
Level 2 vs. Level 3	4958.56	1	4958.56	87.36	.00	.59
Error						
Level 1 vs. Level 2	2508.68	61	41.13			
Level 2 vs. Level 3	3462.334	61	56.76			

Both of these contrasts also produced strong practical effects, as indicated by measure of effect. The graph (see Figure 1) of repeated measures also depicts that no statistically significant differences existed between analytical scores for the two treatments over time, $F(1,61) = .68, p = .41$. As such, both null hypotheses were rejected, which indicated there were differences between the three repeated measures of both experiential learning and direct instruction approaches.

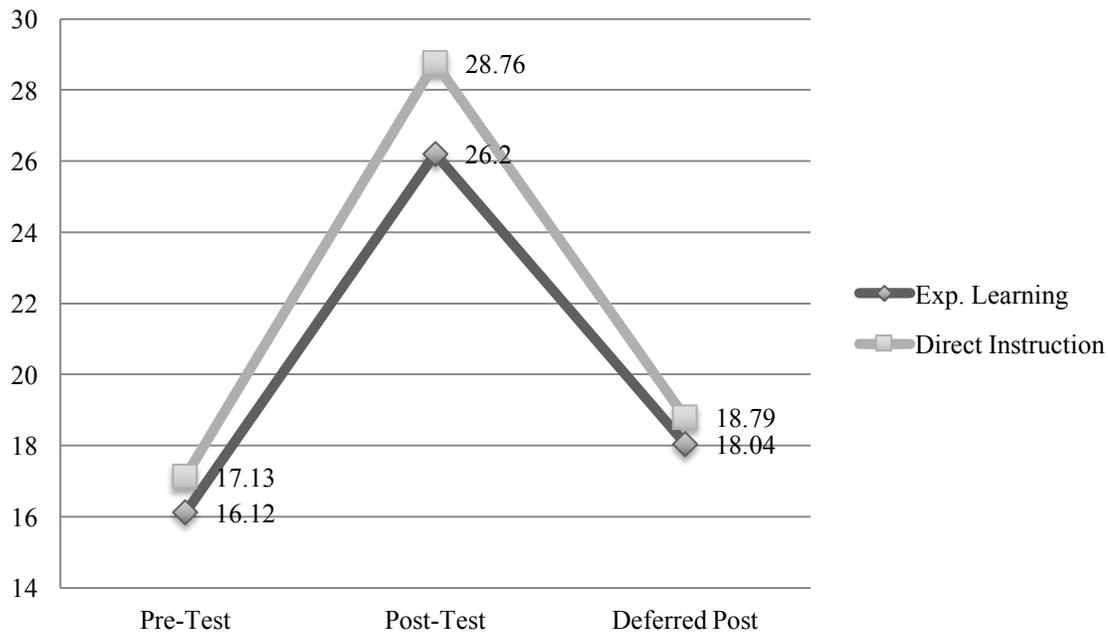


Figure 1. Graph of Repeated Measure Analytical Scores

Conclusions

Initially, students who were taught both experientially and through direct instruction experienced a statistically significant increase in analytical scores. However, that increase was followed by a statistically significant decrease six weeks following instruction. Students in the direct instruction treatment group appeared to outperform their experiential learning counterparts at all three stages of testing. However, that difference was not statistically significant at any stage, and neither group retained a passing knowledge of the content six weeks later.

Specht and Sandlin (1991) noted that, “the key difference in the two learning methods may be in the area of students’ retention of the concepts rather than in their initial perceptions of those concepts” (p. 207). Though the methodology of this study mimicked the six-week deferred post assessment, it failed to confirm Specht’s and Sandlin’s (1991) assertion. Not only did students who were in the experiential learning group perform lower on the analytical assessment directly after instruction than those who were taught using direct instruction, but they also retained the information at a lower rate six weeks later in comparison to their direct instruction counterparts. It is important to note, however, that the analytical scores of students in both direct instruction and experiential approaches experienced a steep decline to near pre-test levels six weeks after instruction. Thus, analytical knowledge was not retained. Bransford, Brown, and Cocking (2000) would identify this problem as an inability to conditionalize the knowledge; learners did not see the relevance and failed to access what they knew when confronted with an opportunity for transfer.

This finding highlights a critical question for educational leaders to consider in educational reform. As states adopt the common core standards nationwide, and thus implement the PARCCS assessment, a greater pressure to conditionalize information will be required. Mere recall will no longer be sufficient. American education, of which agricultural education is subsumed, must carefully establish what the true aims of education should be. As policy directs, so schools should deliver. It is alarming to consider that the American public education system is spending a vast majority of the effort and resources on the banking of analytical knowledge, which this study indicated, is an investment with a rather short half-life.

Recommendations for Practice

This study employed a one-day treatment for 80 students. Teachers should increase the treatment to ensure proper *soak time* for their students. Retention of knowledge is dependent on repetition with the teaching material. Therefore, instructors are encouraged to slow down and take their time when teaching new concepts to students for better mastery (McIntyre & Munson, 2008). Further, to increase retention of knowledge long term, instructors should consider testing students more frequently over an extended time frame (Carrier & Pashler, 1992; Roediger III & Karpicke, 2006). To offset decay and remind students of what they have learned teachers should use retrieval cues (Santock, 2004), especially in instances like this where students completed the deferred post-test in a different location than which they learned the content originally.

In addition, teachers should focus more effort on *conditionalizing* the content by making it meaningful and relevant to the learners (Bransford et al., 2000). Tyler (1949) stated that teachers should make each lesson important for learners by stressing its purpose in their life. Therefore, focusing on meaning, relevance, and importance of the learning can increase students' desire to learn the content, which may have lasting impacts on their ability to recall the information years later.

Recommendations for Future Research

This treatment for this study was completed inside one full day with one program in one state. Therefore, the study should be replicated with additional teachers and students across the state of Oklahoma and beyond to determine the long-term effects associated with the type of pedagogy teachers choose to use. In addition, the treatment should be lengthened to determine the long-term retention of students.

Because frequent testing of a particular subject increases student learning (Carrier & Pashler, 1992), a regression analysis should be conducted to determine if predictions can be made as to how many tests are needed for students to maintain a passing grade of the subject six weeks after the lesson is taught. Qualitative analyses regarding both teachers and students should be conducted to determine the strengths, weaknesses, opportunities, and threats associated with employing polar opposite pedagogies in the classroom and their effect on student retention.

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What's the Problem? Investigating Factors that Influence the Hypothesis Generation Ability of School-Based Agricultural Education Students when Troubleshooting

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Abstract

The purpose of this study was to determine if selected factors influenced school-based agricultural education students' ability to generate a correct hypothesis when troubleshooting. Variables of interest included students' cognitive style, age, GPA, and small gasoline engines knowledge. Kirton's Adaption-Innovation Inventory was employed to assess cognitive style. A researcher developed criterion-referenced test was utilized to determine small gasoline content knowledge. Students were assigned randomly, by cognitive style, to generate a hypothesis for either a simple or complex small gasoline engine problem. A similar number of students were able to correctly hypothesize the fault in their assigned engine. However, differences were noted between the more adaptive and more innovative students. A binary logistic regression revealed that as cognitive style scores increased, the odds of generating a correct hypothesis decreased. Additionally, older students were more likely to generate an incorrect hypothesis. Teachers should encourage students to hypothesize when engaged in problem solving, but should be aware of individual differences such as cognitive style.

Introduction and Literature Review

There is no argument that problem solving is an important component of human existence. Kirton (2003) referred to problem solving as the key to life, and Popper (1999) wrote a book titled, *All Life is Problem Solving*. There is, however, debate in the literature as to the definition of problem solving, the processes of problem solving, and whether problem solving is an educational goal, or a method of instruction (van Merriënboer, 2013). Chi and Glaser (1985) regarded problem solving as "a situation in which you are trying to reach some goal, and must find a means for getting there" (p. 229). Further, Jonassen (2000) added that solving specific problems must have social, cultural, or intellectual value.

Problems differ in complexity, which is a function of the number of issues and variables present, how connected the variables are, and how stable they are over time (Funke, 1991). Additionally, problems vary in structure. Well-structured problems are typical of those found in schools. These problems feature (a) known rules, (b) constraints, (c) principles the problem solver utilizes to achieve the goal, and (d) normally have a single correct answer (Jonassen, 2000). Ill-structured problems, on the other hand, tend to be more complex and occur in everyday and professional life (Jonassen, 2000). Often these do not have well defined goals, operations, and constraints, and may not have a single correct answer (Jonassen, 1997). They also may require the problem solver to employ knowledge across more than one content domain (Jonassen, 2000).

Problems are often defined as being domain-specific, meaning that problems may require a certain type of knowledge to solve (Hegarty, 1991). According to Jonassen (2001) real-world problems are typically situated within a specific context and are considered ill-structured. Well-structured problems, however, are not typically context specific. Well-structured problems often require proficiency at general problem solving skills, known as heuristics, and are considered abstract in nature (Jonassen, 2000).

Troubleshooting, or technical problem solving, is a subset of problem solving where the problem is ingrained in a real-life situation and the troubleshooter engages in diagnosing a fault (Custer, 1995; Jonassen, 2000; MacPherson, 1998). More simply, troubleshooting is the attempt to locate the reason for a malfunction in a given system (Morris & Rouse, 1985). On the continuum, troubleshooting occurs between the well-structured

and ill-structured problem structure (Jonassen, 2000). Individuals engaged in troubleshooting must have the ability to use symptom information to generate and test possible hypotheses about the faulty system (Jonassen, 2001) and use their “creativity, ingenuity, and inventive thought processes” (MacPherson, 1998, p. 1).

Hegarty (1991) listed two broad types of knowledge – general and specific – that influence an individual’s ability to solve mechanical problems. General knowledge is described as being useful to all types of problem solving, while specific knowledge is useful in the mechanical domain. General knowledge can include heuristics, such as identifying a goal state and eliminating differences between it and the current situation (Hegarty, 1991). Specific knowledge is most useful in semantically rich domains, such as those found in mechanics (Hegarty, 1991). Specific knowledge can be divided into conceptual knowledge and procedural knowledge. Conceptual knowledge is described as an understanding of “items of knowledge” (McCormick, 1997, p. 143) that leads to “conceptual understanding” (McCormick, 1997, p. 143). In contrast, procedural knowledge assumes knowing *how* to perform tasks (Hegarty, 1991; McCormick, 1997).

Other research in the troubleshooting ability of individuals has focused on differences between expert and novice problem solvers and differences in individual characteristics. Johnson (1989) described differences in the performance of experts and novices on troubleshooting tasks related to gasoline powered electrical generators. Experts tended to seek specific information through technical evaluation, and novices tended to seek superficial, sensory information. Gitomer (1988) utilized three experiments to determine individual differences in the electronics troubleshooting ability of expert and novice troubleshooters. Overall, Gitomer (1988) concluded that the experts were able to develop mental models that represented systems much more accurately than the novices, who tended to become distracted by superficial features of the problem (Gitomer, 1988).

Problem Solving Research in Agricultural Education

Scholars in agricultural education have conducted research to understand problem solving and troubleshooting better. Friedel, Irani, Rhoades, Fuhrman, and Gallo (2008) conducted a study to explore the relationships between critical thinking and problem solving in the context of Mendelian genetics of undergraduate students. In addition, the cognitive style of the students was assessed using the Kirton Adaption-Innovation Inventory (KAI). Critical thinking disposition showed no relationship to problem solving level, and cognitive style was not related to problem solving level (Friedel et al., 2008). Lamm, Rhoades, Irani, Unruh Snyder, and Brendemuhl (2011) investigated the relationships between critical thinking disposition, cognitive style, and learning styles of undergraduates who participated in a study abroad program in the Fall Semester of 2009. No relationship was found between cognitive style and learning styles of the students (Lamm et al., 2011).

Using Kirton’s (2003) Adaption-Innovation theory and Bransford’s (1984) IDEAL problem solving model as a frame, Lamm et al. (2012) conducted focus group interviews to investigate how cognitive style influenced group problem solving of students who attended a study abroad course in Costa Rica. The authors concluded that the homogenous adaptor group spent so much time focused on problem details that they were unable to solve the problem (Lamm et al., 2012). The homogenous innovator group solved the problem, but not in a linear fashion. Instead, they tended to act out potential ideas before thinking them through thoroughly. Finally, the heterogeneous group of adaptors and innovators was able to work together to identify key problem aspects, create goals as a group, and think about ideas prior to acting them out, which is as an attribute of adaptors and innovators working together and achieving balance (Lamm et al., 2012).

Pate, Wardlow, and Johnson (2004) conducted an experimental study to investigate the small gasoline engines troubleshooting performance of undergraduate students when utilizing the think-aloud pair problem solving (TAPPS) technique. They reported no differences in time to solution between those who employed the TAPPS technique and the control group (Pate et al., 2004). Pate and Miller (2011a) sought to determine the effects of

TAPPS on secondary students enrolled in either agricultural or industrial education courses focused on small gasoline engine technology. Their results indicated no statistically significant differences existed in the problem solving success of students who utilized the TAPPS technique versus those who worked independently (Pate and Miller, 2011). Further, Pate and Miller (2011b) conducted an interpretive analysis of audio recording of students who utilized the TAPPS technique. The overall purpose of this study was to compare the metacognitive statements of students who solved a compression related small gasoline engine problem successfully, using TAPPS, with those who were unsuccessful. The researchers concluded that the TAPPS technique was inappropriate for use with secondary students because of their lack of domain specific knowledge (Pate & Miller, 2011b).

Blackburn, Robinson, and Lamm (2014) conducted a study to investigate the problem solving ability of undergraduate students enrolled in small gasoline engines course. The authors found that the *more innovative* students who were assigned the simple problem were the most efficient problem solvers, and the *more innovative* students assigned the complex problem were the least efficient. [Blinded Authors, 2015] reported students who generated correct hypotheses were the most efficient problem solvers, regardless of the complexity of their assigned problem. Regardless of the vast amount of literature on problem solving in agricultural education, there is a lack of information regarding factors that affect students' abilities to generate hypotheses during the problem solving process.

When dealing with a new situation, problem solvers must use any prior knowledge of a and gather information to formulate hypotheses (Johnson, 1988). Specifically, when individuals engage in solving problems, they must be able to generate and test their hypotheses effectively (Jonassen, 2001). The ability to solve problems in systems "encourages creativity, ingenuity, and inventive thought processes" (MacPherson, 1998, p. 1). Generating a correct hypothesis helps the problem solver to identify the fault in a system efficiently (Jonassen, 2000).

Theoretical Framework

Situated cognition served as the theoretical framework of this study (Greeno, Collins, & Resnick, 1992). The foundation of situated cognition is that all cognitive processes are situated in contexts, both physical and social (Greeno, 1989; Schunk, 2008). Further, "[s]ituated cognition emphasizes the importance of context in establishing meaningful linkages with learner experience and in promoting connections among knowledge, skill, and experience" (Choi & Hannafin, 1995, p. 54). Additionally, learning is influenced by the interaction of numerous processes (Schunk, 2008). For example, learning is connected with motivation: positive experiences with instruction can increase motivation and learners who are motivated may seek additional instruction (Schunk, 1995). Situated cognition addresses the notion that learning occurs in authentic contexts and performance assessments should be employed as an authentic measure of student achievement (Greeno et al., 1992; Schunk, 2008).

Situated cognition does not address problem solving as a separate theory; rather, it is posited that problems arise and are situated in specific contexts (Kirsh, 2009). Further, learning experiences, such as problem solving activities, should pique students' interest and hone their ability to reason (Greeno et al., 1992). Additionally, the situated view of problem solving emphasizes the interaction of cognition and various situations, rather than a more mathematical approach, as seen in information processing models (Greeno, 1989). Instead of applying heuristics, the situated context view focuses on the problem solver becoming deeply familiar with the context and structure of the problem at hand, then utilizing the information to derive a solution (Greeno, 1989). Although the situated cognition view of problem solving can be perceived as less linear than other approaches, the process of generating and evaluating ideas and hypotheses of potential solutions remains vital (Kirsh, 2009). The problem context is more important than employing general problem solving skills since it is the context that

drives the idea generation process and the number of potential ideas or hypotheses the problem solver may generate is context dependent (Kirsh, 2009).

Conceptual Framework

Conceptually, this study was framed using Johnson’s (1989) Technical Troubleshooting Model (see Figure 1). The crux of the model lies within an individual’s ability to generate one or more hypotheses. The model is defined by two distinct phases: the hypothesis generation phase and the hypothesis evaluation phase (Johnson, 1989). During the first phase, individuals must acquire and interpret information prior to generating a hypothesis.

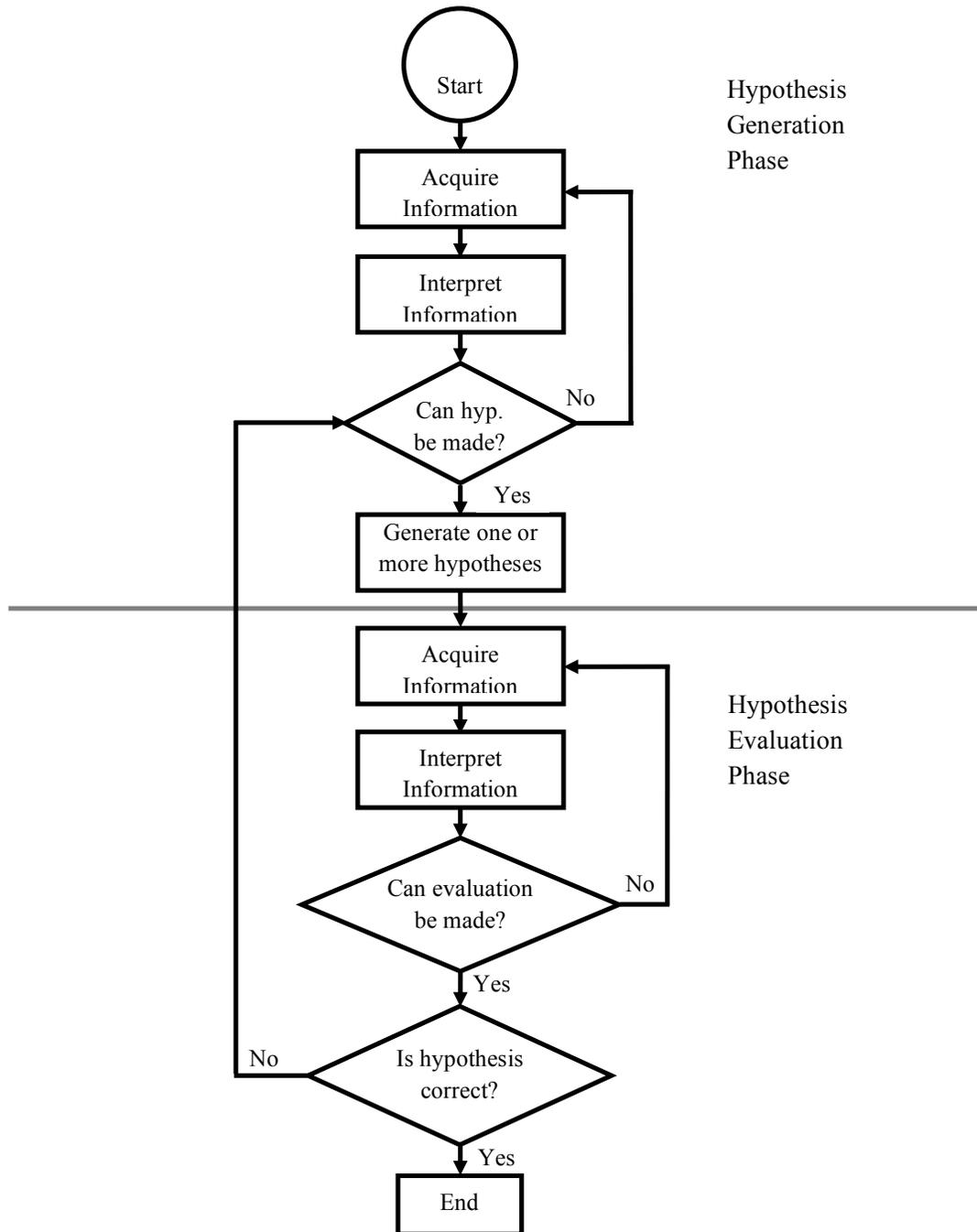


Figure 1. Technical Troubleshooting Model. Adapted from “A description of expert and novice performance differences on technical troubleshooting tasks” by S. D. Johnson, 1989, *Journal of Industrial Teacher*

Both internal and external sources of information are utilized to generate hypotheses (Johnson, 1989). Declarative and procedural knowledge within long-term memory comprise the internal information (Schunk, 2008). Troubleshooters must possess and be able to utilize these types of knowledge.

Additionally, Jonassen (2001) listed system knowledge, procedural knowledge, and strategic knowledge as requirements of troubleshooters. System knowledge is the basic understanding of how a system operates, procedural knowledge is achieved when the troubleshooter knows how to perform tests and employs problem solving procedures, and strategic knowledge is when the troubleshooter comprehends how and when to employ procedures (Jonassen, 2001). The troubleshooter must then synthesize the information and determine if hypotheses can be generated (Johnson, 1989). Once a hypothesis has been generated, it must be evaluated. Hypothesis evaluation occurs through acquiring and interpreting additional information. Once the hypothesis is evaluated, the troubleshooter makes a decision to confirm or disconfirm the hypothesis. If the hypothesis is confirmed, then the troubleshooter pursues a course of action to correct the problem. If the hypothesis is disconfirmed, the troubleshooter cycles back to the first phase of the model and generates a new hypothesis to evaluate (Johnson, 1989). The ability to generate accurate hypotheses quickly is a characteristic of successful troubleshooters (Vasandani & Govindaraj, 1991).

Purpose and Objectives

The purpose of this study was to determine if selected factors influenced school-based agricultural education students' ($n = 77$) ability to generate a correct hypothesis when troubleshooting. Specifically, the factors of interest included (a) age, (b) grade point average (GPA), (c) cognitive style, and (d) performance on a content examination. The following research objectives guided the study.

1. Determine the knowledge of school-based agricultural education students regarding small gasoline engines.
2. Determine the hypothesis generation ability of school-based agricultural education students based on cognitive style.
3. Determine the influence of age, GPA, cognitive style, and performance on a content examination on school-based agricultural education students' ability to generate a correct hypothesis.

Methods

The data associated with this study were collected as a component of a larger research project that sought to determine if differences existed in problem solving ability of school-based agricultural education students in the area of small gasoline engines. Secondary agricultural education programs were selected based on teacher participation in a two-day small gasoline engines workshop held on the campus of Oklahoma State University in June 2012. During the workshop, the teachers were engaged in approximately 12 hours of small gasoline engines instruction provided by a Briggs & Stratton® technician trainer. At the completion of the workshop, each teacher was provided with small gasoline engines curriculum and nine engines. The curriculum was comprised of four lessons including (a) 4-cycle theory, (b) fuel systems and carburetors, (c) electrical systems, and (d) compression. These lessons were based on information from the Briggs & Stratton® PowerPortal webpage and curriculum from the small gasoline engines course at Oklahoma State University. A troubleshooting objective was included in each lesson to ensure students were familiar with identifying engine fault states. Additionally, the teachers provided lesson worksheets and quizzes as evidence the content was taught.

Once the semester began, two site visits were made to each school. During the first site visit, Kirton's Adaption-Innovation Inventory (KAI) was administered to determine the cognitive style of students. Also, student personal and educational characteristics were collected using a researcher created questionnaire. The second site visit was conducted after the teachers had taught the curriculum to their students. During this visit, a 30-item researcher created criterion-referenced test was administered to students to determine their content knowledge. The students were then assigned to either the simple or complex problem group and given a scenario that described engine symptoms that would occur if they had tried to start it. Specifically, the simple problem related to a closed spark plug gap and the complex problem was debris within the carburetor's main jet. Oklahoma State University IRB approved this study under the condition that the students would not actually start the engines. The students were required to generate a written hypothesis on the scenario sheet regarding which engine system was at fault. Students were not told whether their hypothesis was correct, but were allowed to engage in the problem solving activity regardless. The researcher later coded these statements as *correct* or *incorrect*, based on information of the Briggs & Stratton® PowerPortal.

The study utilized a completely randomized factorial (CRF) 2x2 design where students ($n = 77$) were assigned randomly to generate a hypothesis for either a simple or complex small engine problem. In all, 68 students completed all parts of the study. A total of 41 students completed the simple problem, and 27 completed the complex problem.

Instrumentation

The instrumentation consisted of a researcher created demographics questionnaire, the KAI, a 30-item criterion-referenced test, and the students' hypotheses. The demographics section consisted of questions to determine the students' (a) age, (b) grade level, (c) GPA, and (d) ethnicity. The KAI is comprised of 32 items designed to assess cognitive style as *more adaptive* or *more innovative*. Scores on the KAI can range between 32 and 160, with lower scores indicating *more adaptive* and higher scores equating to *more innovative*. The *more adaptive* prefer structure when solving problems. These individuals are able to work efficiently within the bounds of their current paradigm and have a tendency to prefer technical solutions. The *more innovative* prefer less structure and can feel constrained when working in a rigid environment (Kirton, 2003). These individuals do not prefer technical solutions and proliferate ideas when engaged in problem solving (Kirton, 2003). Several studies have been conducted to determine the reliability of the KAI (Kirton, 2003). Kirton (2003) reported reliability estimates for populations of teenagers ranging from 0.74 to 0.86. Post-hoc reliability yielded a Cronbach's alpha of 0.71 for this sample of students. Regarding hypotheses generated by students, they were deemed *correct* if the major engine system at fault was identified.

The criterion-referenced test was developed by the researcher based on curriculum from the Oklahoma State University small engines course, as well as information available on the Briggs & Stratton® PowerPortal webpage. The specific format chosen for the test was multiple-choice with four options. The test was evaluated for face and content validity by a panel of experts, including three agricultural education faculty members and one faculty member in agricultural engineering who taught the small gasoline engines course at Oklahoma State University. The panel of experts reviewed the instrument for semantics, ease of reading, content, and general construction of questions. All recommended changes to the instrument were made prior to its administration with students. The eight guidelines described by Wiersma and Jurs (1990) to ensure reliability of criterion-referenced tests were followed. Table 1 lists the eight factors as well as the researcher's attempts to address each.

Table 1

Examples of the Eight Factors Necessary for Establishing Reliability of Criterion-referenced Tests, as Identified by Wiersma and Jurs (1990), and How They Were Addressed

Factor	How Factors were Addressed
1. Homogeneous items	Items were of the same font size and style.
2. Discriminating items	Varying difficulty of items.
3. Quantity of items should	30 multiple-choice items.
4. High quality test	Format consistency verified by the panel of experts
5. Clear directions	Directions were read aloud and printed at the top of the tests provided to students.
6. Controlled environment	The test was administered by the students' respective teacher in their normal classroom setting.
7. Participant motivation	Students were informed by their respective teacher if she or he was opting to use the test as a part of the course grade.
8. Scorer directions	An answer key was developed to ensure the questions were assessed accurately.

Data Analysis

Data associated with objectives one and two were analyzed via descriptive statistics including means, standard deviations, percentages, and frequencies. Logistic regression was employed to meet the third objective of the study. Logistic regression is utilized when the outcome variable is categorical in nature (Field, 2009). Regarding this research study, the outcome variable was whether or not a student generated a correct hypothesis for his or her assigned problem. Nagelkerke's R^2 was calculated to determine the practical significance of the overall regression model. Nagelkerke's R^2 is a useful measure of practical effect of logistic regression because the value ranges between zero and one, making interpretation similar to the classical R^2 utilized to measure effect size in multiple regression (Field, 2009; Nagelkerke, 1991).

Findings

A total of 68 students were administered a small gasoline engines test after they had been taught the content by their respective teachers. The mean score on the test was 18.63 (62.01%) items correct out of a possible 30 (see Table 2). The students with lowest mean score ($M = 17.44$; $SD = 5.13$) were the *more innovative* students who generated an incorrect hypothesis. The *more innovative* students who correctly hypothesized their assigned problem earned highest mean score ($M = 19.89$; $SD = 4.70$).

Table 2

Mean Content Knowledge Test Scores by Hypothesis Generation and Cognitive Style (n = 68)

Hypothesis Generation	Cognitive Style	<i>M</i>	%	<i>SD</i>	<i>n</i>
Correct	More Adaptive	18.68	62.27	6.37	22
	More Innovative	19.89	66.30	4.70	19
	Total	19.24	64.13	5.63	41
Incorrect	More Adaptive	18.22	60.73	3.90	9
	More Innovative	17.44	58.13	5.13	18
	Total	17.70	59.00	4.69	27
Total	More Adaptive	18.55	61.83	5.70	31
	More Innovative	18.70	62.33	5.00	37
	Total	18.63	62.01	5.29	68

In all, 34 students were assigned the simple problem, of which 20 (58.82%) students generated a correct hypothesis (see Table 3). Of the students who hypothesized the simple problem correctly, 14 (41.18%) were *more adaptive* and six (17.64%) were *more innovative*. A total of 14 (41.18%) students generated an incorrect hypothesis. Of the students who hypothesized the simple problem incorrectly, five (14.71%) were *more adaptive* and nine (26.47%) were *more innovative* (see Table 3).

Table 3

Hypothesis Generation for the Simple Problem Scenario by Cognitive Style (n = 34)

Cognitive Style	Correct	%	Incorrect	%
More Adaptive	14	41.18	5	14.71
More Innovative	6	17.64	9	26.47
Total	20	58.82	14	41.18

Note. KAI score range 32 to 95 = more adaptive; 96 to 160 = more innovative

A total of 34 students were assigned to generate a hypothesis for the complex problem. Overall, 21 (61.80%) students correctly hypothesized the complex problem (see Table 4). Eight (23.53%) *more adaptive* and 13 (38.24%) *more innovative* students generated a correct hypothesis. A total of 13 (38.24%) generated an incorrect hypothesis. Four (11.76%) *more adaptive* and nine *more innovative* (26.47%) students incorrectly hypothesized the complex problem (see Table 4).

Table 4

Hypothesis Generation for the Complex Problem Scenario by Cognitive Style (n = 34)

Cognitive Style	Correct	%	Incorrect	%
More Adaptive	8	23.53	4	11.76
More Innovative	13	38.24	9	26.47
Total	21	61.80	13	38.24

Note. KAI score range 32 to 95 = more adaptive; 96 to 160 = more innovative

Table 5 provides a summary of the predictor variables utilized in the logistic regression. The average age of the students was 16.46 (*SD* = 1.13). The average score on the small engines content knowledge test was 18.63 (*SD* = 5.29) with a range of six to 28 questions correct out of 30. Finally, student's cognitive style ranged from 66

to 119 with an average score of 94.60 ($SD = 12.44$). The students' GPA ranged from 2.50 to 4.00 with a mean of 3.38 ($SD = 0.48$) (see Table 5).

Table 5

Summary of Predictor Variables

Variable	Minimum	Maximum	M	SD
Age	15	18	16.46	1.13
Test Score	6	28	18.63	5.29
Cognitive Style	66	119	94.60	12.44
Grade Point Average	2.50	4.00	3.38	0.48

Prior to interpreting the logistic regression model, the Hosmer and Lemeshow Goodness of Fit (HLGF) test was calculated to determine how well the model fit the data (see Table 6). Specifically, the HLGF ($\chi^2_{HL} = 6.77$) was determined to be not statistically significant ($\alpha > .05$).

Table 6

Results of the Hosmer and Lemeshow Goodness of Fit Test

	χ^2	df	p
Step 1	6.77	7	.45

Overall, the regression model predicted 81.1% of the cases correctly. To determine practical significance of the overall regression model, Nagelkerke's R^2 was calculated. The value of Nagelkerke's R^2 was 0.55. Table 7 depicts the results of the logistic regression with correctness of a generated hypothesis as the outcome variables. GPA and test score were determined not to be statistically significant predictors at the $\alpha = .05$ level. The Wald statistics for cognitive style ($Wald = 2.52$; $p = .01$) and age ($Wald = 5.37$; $p = .02$) were found to be statistically significant, indicating the variables were significant predictors in the overall model.

Table 7

Logistic Regression of Hypothesis Generation

Variable	B	SE	Wald	df	p	Odds Ratio
GPA	-2.94	1.85	2.52	1	.11	0.05
Cognitive Style	-0.13	0.05	5.93	1	.01	0.88
Age	-2.34	1.01	5.37	1	.02	0.10
Test Score	0.11	0.10	1.26	1	.26	1.12

Note. $\alpha = .05$

Discussion and Implications

The overall mean score on the small engines test would barely be considered passing in most school settings. Hegarty (1991) outlined the importance of various types of knowledge in the mechanical problem solving process. Further, Johnson (1988) highlighted the importance of the type of information sought during the problem solving process. How could a majority of students correctly hypothesize their assigned problem yet score so poorly on a criterion referenced test? Perhaps some students had prior experiences troubleshooting small gasoline engines and therefore had more procedural knowledge than domain specific knowledge (Hegarty, 1991). Could it be that basic small engine knowledge is not needed by some students to successfully

troubleshoot? Or, perhaps these particular students are kinesthetic learners who have prior experiences in troubleshooting, but are poor test takers.

From a situated cognition perspective, generating a hypothesis in the context of small gasoline engines would be considered authentic in nature (Greeno et al., 1991; Kirsh, 2009). Nearly equal numbers of students generated correct and incorrect hypotheses for their assigned problem. However, when viewing the data based on cognitive style, the *more adaptive* were more successful when hypothesizing the simple problem. The *more innovative* generated more correct hypotheses for the complex problem. The results of this study indicate that over 60% of the students were able to hypothesize correctly.

Cognitive style and age of the students were determined to be significant predictors in the logistic regression model. Both variables had odds ratios below 1.00, indicating as the predictor increased the outcome likelihood decreased (Field, 2009). In other words, as scores on the KAI increased (i.e., students were *more innovative*), the chances of generating a correct hypothesis decreased. Kirton (2003) stated that people who are *more innovative* tend to proliferate ideas in the problems solving process. Perhaps these students mentally generated multiple hypotheses and struggled to choose one to write down? Kirton (2003) stressed that neither cognitive style is superior during the problem solving process; the *more innovative* can struggle when solving simple problems because of the number of ideas that can be generated when hypothesizing.

Similarly, as student age increased the likelihood of hypothesizing correctly decreased. Although age has rarely been utilized as a variable in research on problem solving, Johnson (1988) found that the greatest difference in expert and novice troubleshooting was the types of information gathered and hypotheses generated. It is beyond reason to assume any of these students are experts in small gasoline engines. Older students should have more experiences in school settings and could have been exposed to more problem solving situations. Intuitively, it would be expected that older students would perform better. However, the results of this study do not support this.

Surprisingly, scores on the content knowledge examination were not a significant predictor in this model. Previous research has been very clear about the importance of various types of knowledge in the problem solving process (Hegarty, 1991; Larkin, McDermott, Simon, & Simon, 1980; McCormick, 1997; Newell & Simon, 1972; Simon, 1979). It stands to reason that knowledge about a topic would lead to better hypotheses. Yet, the findings of this study do not support this notion.

Recommendations

Additional research is needed to clarify the role of cognitive style in the troubleshooting process, specifically when hypothesizing. Further, requiring students to utilize think-aloud protocols, as described by Pate et al. (2004), could allow for an estimation of metacognitive procedures utilized when hypothesizing. This would allow for the determination of whether the hypothesis generated is an educated guess or simply a shot in the dark. Additionally, post-troubleshooting reflection sessions should be held in future studies to understand student success and failure more deeply.

More research also is needed regarding the influence of content knowledge on troubleshooting. Items on the criterion-referenced test used in this study should be analyzed to determine if differences exist based on higher and lower orders of thinking (Bloom, Engelhart, & Krathwohl, 1956). Further, individual item content should be investigated to determine if content directly related to the problem context impacts hypothesizing ability. Additional studies should consider gauging students' procedural knowledge when troubleshooting.

Practically, educators should note the importance of hypothesizing in the problem solving process. These metacognitive strategies can greatly impact student learning and critical thinking (Schunk, 2008). Situated

cognition stresses the importance real life contexts have in motivating student to learn (Schunk, 1995). Employing troubleshooting activities in agricultural education is one such way for teachers to incorporate authentic situations into their curricula. Individual differences, such as cognitive style, are out of the control of educators. Thankfully, the research is clear that all students can solve problems, regardless of their cognitive style. Differences do, however, arise in the manner in which students progress through the problem solving process. As such, understanding how students with differing cognitive styles think through problems can assist teachers when working with diverse learners.

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Exploring the Differences in Water Conservation Behaviors among High Water Users in Three Regions of Florida: Hints for Extension Educators

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Abstract

Competition for water sources in urban areas of Florida has increased due to increased population and human activities. High water users have been identified as a specific group Extension should focus water conservation education on due to their low awareness of water issues and active landscape water use. In order to ensure the effectiveness of Extension programs targeting high water users, this study sought to explore regional differences in water conservation behavior engagement within Florida high water users. An online survey was conducted to capture responses of high water users (N = 932) in southeast, southwest, and central regions for this comparative study. Respondents were asked to indicate their current engagement in water use behavior, application of water conservation strategies, and the likelihood of engaging in water conservation and related societal behaviors. Regional differences were found in all four examined constructs. Therefore, Extension educators should develop and deliver educational programs relevant to regional audiences' behavior patterns instead of treat all high water users in Florida as a whole to ensure program effectiveness.

Introduction

Water conservation is one of the major program areas Extension has emphasized. The essentiality of water to human life has led to increased water demands as the world population continues to grow (Oki & Kanae, 2006; Vörösmarty, Green, Salisbury, & Lammers, 2000). Since water issues, including water pollution and contamination, water scarcity, degradation of water quality, waterlogging, and increased water salinity levels, have been reported worldwide, problem-solving strategies are needed in order to alleviate water issues and enhance the sustainability of water resources (Friedman, 2011). Evidence has been found that water issues are specifically related to human activities and climate change, which will only increase as the human population grows and human activity increases (Vörösmarty et al., 2000; Young, Dooge, & Rodda, 1994). As a result, the U.S. Environmental Protection Agency (USEPA) has set the goal of water protection in the U.S. as to “protect and restore waters to ensure that drinking water is safe and sustainably managed, and that aquatic ecosystems sustain fish, plants, wildlife, and other biota, as well as economic, recreational, and subsistence activities” (USEPA, 2014a, para. 2). According to the strategic plan USEPA developed about water protection, environmental education associated with water should be enhanced by outreach services to communities and stakeholders, which is the role that Extension serves (USEPA, 2014b).

According to the estimated national water use report published by Maupin, Kenny, Hutson, Lovelace, Barber, and Linsey (2014), public supply was one of the top sources of water withdrawals in the U.S. in 2010, particularly in suburban and urban areas (USEPA, 2014c). Based on the national statistics, about 70% of the daily water consumption in the U.S. is for indoor uses, including drinking, food preparation, washing clothes and dishes, and flushing toilets, and 30% for outdoor uses, including watering lawns and gardens or maintaining pools, ponds, or other landscape features in a domestic environment (Maupin et al., 2014; USEPA, 2014c). As the national population continues to grow, increased competition for water resources is expected due to increased demands (USEPA, 2014d). In order to relieve the pressure of water demands, additional water sources and water conservation strategies have been sought and applied (Maupin et al., 2014).

Florida is a state abundant in water resources known as the state with “the most plentiful freshwater aquifers in the United States” (Florida Department of Environmental Protection [DEP], 2015, para. 1).

Recently, increased pressure on water resources have been reported in Florida due to a growing population, prosperous tourism, and an active agricultural industry (Barnett, 2007; Marella, 2013). According to the DEP (2014), public water supply demand has exceeded agricultural water demands. Florida residents consume a large volume per capita at 134 gallons per day (Marella, 2014). Within the daily water consumption, indoor and outdoor water uses split the amount of water in half. The primary outdoor water use in Florida is for landscape irrigation, although “more than 50% of the water typically applied to lawns is lost to evaporation or runoff due to overwatering” (South Florida Water Management District, 2008, p. 3). Urbanization, as a result of increased population in Florida, has led to increased water use for landscape irrigation (Haley, Dukes, & Miller, 2007). In spite of the high water consumption of landscape irrigation, many Florida residents are not aware of how the landscape management practices they use can impact the environment (Israel & Knox, 2013).

A specific group of excessive water users, known as high water users were identified by Monaghan, Ott, Wilber, Gouldthorpe, and Racevskis (2013) as having specific demographic characteristics including being a resident of a neighborhood with a homeowners association (HOA), being older, and achieving a higher income and education level than the general public. In addition, high water users are identified as having a specific behavior pattern associated with landscape management including a preference for hiring a contractor to manage their landscape instead of managing their own. This group of high water users tend to consume large amounts of water for landscape irrigation (Davis & Dukes, 2014; Huang, Lamm, & Dukes, 2015). Given their low engagement in water conservation behaviors, additional attention should be paid to high water users when developing water conservation education (Huang et al., 2015).

Extension has made efforts to provide information and educational programs to various publics about how to properly manage water use and conserve water resources (University of Florida IFAS Extension, 2014). Note that Extension educators should reach urban clientele and rural clientele differently due to their different needs, Extension programs should be developed with a focus on information relevancy to better communicate with the urban audiences (Wagner & Kuhns, 2013). Additionally, even if facing audiences with similar characteristics, they are likely to differ by regions in perceptions and practice implementation even within a state (Benham, Braccia, Mostaghimi, Lowery, & McClellan, 2007). Therefore, by identifying the regional water conservation behavioral differences in high water users in Florida, regional Extension educators can better develop programs tailored to their audience’s need. The Extension educators may utilize high water users’ tendency of performing given types of water conservation behaviors for program development with enhanced positive learning outcomes as a result. The fifth priority of the National Research Agenda is to provide “efficient and effective agricultural education programs” (Doerfert, 2011, p. 10), which can be informed by research examining the regional differences of audiences in Florida. The findings of this study can be used by Extension educators to better develop water conservation programs targeting high water users with their regional needs and interests in mind resulting in enhanced impacts.

Conceptual Framework

This study was designed around the concept of audience segmentation (Andreasen, 2006; Kotler & Roberto, 1989). As derived from the traditional mass marketing approach, audience segmentation emphasizes the importance of social power within a group exhibiting similar characteristics, like geographical characteristics, socio-demographic attributes, psychological profiles, and/or behavioral characteristics that can be used in social marketing for behavior change (Andreasen, 2006; Kotler & Roberto, 1989). By targeting a homogeneous group with shared identified needs the influences expected during the marketing process can be enhanced (Andreasen, 2006; Kotler & Roberto, 1989). By segmenting audiences, programs can be developed to better utilize resource allocation while being organized based on audiences’ specific motivation factors, needs, and interests (Andreasen, 2006; Kahlor & Stout, 2010).

As an important component of social marketing, audience segmentation has been frequently used in environmental conservation studies (Shaw, 2010). In addition, Adhikarya (1994) suggested that audience segmentation should be used in Extension programming to enhance the effectiveness of programs by providing proper information to proper audiences with their needs in mind. Since heterogenous group may hinder the effectiveness of Extension educators' communication, Kuipers, Shivan, and Potter-Witter (2013) sought to identify optimal approaches to communicating with nonindustrial private forest landowners. Kuipers et al. (2013) identified four groups within these nonindustrial private forest landowners. Each of the four groups had different forest ownership reasons and values and preferred communication channels. Despite the lack of use of Extension services of these nonindustrial private forest landowners in the target location of the study, outreach services and information were suggested to be provided in ways that resonate with forest landowners' associated topics of interest via the channels they preferred to use (Kuipers et al., 2013).

Individuals' demographic characteristics, experiences applying a given practice and using Extension services, level of information sharing, and extent of concern about community norms can also be used to segment publics into groups (Israel & Hague, 2002). As a result, audience segmentation can be a useful strategy for program recruitment to ensure program effectiveness (Israel & Hague, 2002). In the case of Extension programs focused on high water users in Florida, multiple studies have indicated the importance of audience segmentation to properly approach this specific audience separately from the general public. Monaghan et al. (2013) conducted a case study about water conservation practices in a county of Florida to examine homeowners' demographic and lifestyle characteristics and their characteristics of landscape water use. The findings of Monaghan et al.'s (2013) study indicated that a specific group of homeowners was identified as exhibiting a limited level of engagement in water conservation practices and interest in learning about water conservation strategies, which implied less care about water consumption issues than the general public. Huang et al.'s (2015) study confirmed these findings by comparing high water users who had shared characteristics as the respondents in Monaghan et al.'s (2013) study with the general public in the state of Florida. Based on high water users' specific needs and behavioral patterns, a need to develop water conservation programs relevant to these high water users existed (Huang et al., 2015). Based on the previous literature, a conceptual model was designed and used in Huang et al.'s (2015) study and will be used as the foundation for this research (see Figure 1).

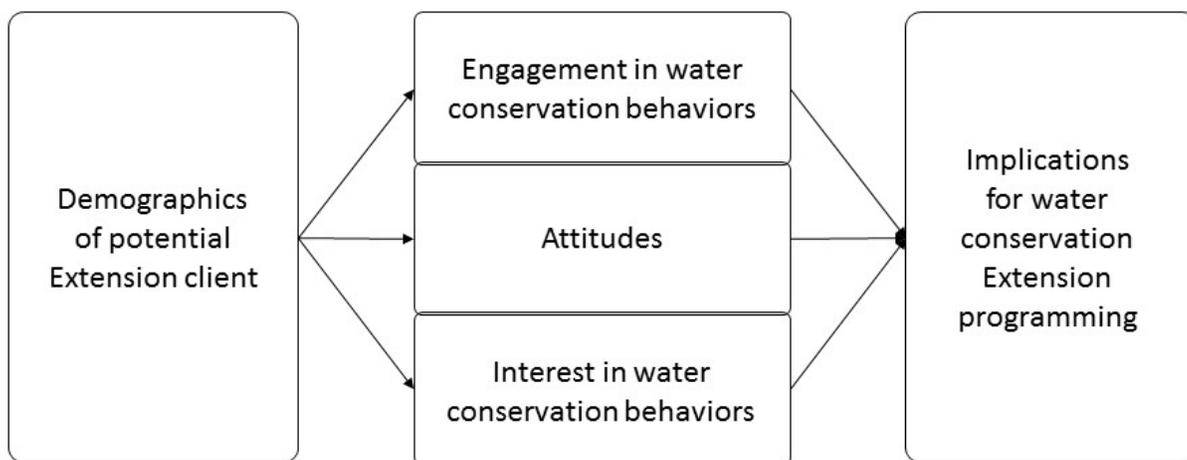


Figure 1. Audience segmentation conceptual model for Extension programming associated with water conservation behaviors (Huang et al., 2015).

This study was designed to further explore the need of audience segmentation by regions within a single state to inform Extension programming approaches. The findings will provide implications for Extension

educators to better develop water conservation programs tailored to regional high water users' engagement, attitudes, and interests in water conservation behaviors. Extension educators can apply the findings of this study to their programming to enhance the persuasiveness of the message and the potential of audiences' adoption of water conservation behaviors.

Purpose and Objectives

The purpose of this study was to identify differences in levels of engagement in water conservation behaviors among high water users in different urban areas of Florida in order to develop Extension programs tailored to region-specific high water users' adoption of water conservation behaviors. The objectives were to compare:

1. The water use behaviors high water users of the three regions currently engage in;
2. The water conservation strategies high water users of the three regions currently apply;
3. The water conservation behaviors high water users of the three regions would like to engage in; and
4. The societal behaviors associated with water conservation high water users of the three regions would like to engage in.

Methods

This study was comparative, designed to explore the differences in high water users in three regions of Florida: Orlando region (Central Region), Tampa/Sarasota region (Southwest Region), and Miami/Fort Lauderdale region (Southeast Region). An online survey approach was used to deliver the same questionnaire to respondents in three targeted regions of Florida known to contain high water users based on utility bills in the area. The respondents were identified high water users who met certain criteria of overirrigators according to Davis and Dukes' (2014) study. The overirrigator criteria were the single-family residential account holders living in a given utility company service area that showed a monthly ratio of estimated irrigation volume to gross irrigation requirement at "greater than 1.5 at least [three months per year] for three consecutive years" (Davis & Dukes, 2014, p. 2).

The survey instrument was researcher-adapted from the 2012 RBC Canadian Water Attitudes Study (Patterson, 2012). Questions examining respondents' water use behaviors, current engagement in water conservation strategies, likelihood of engaging in water conservation and societal behaviors associated with water conservation, and demographics were used to capture the responses.

First, respondents were asked to indicate their frequency of performing seven water use behaviors on a five-point Likert-type scale ranging from 1 = *Never*, 2 = *Almost Never*, 3 = *Sometimes*, 4 = *Almost Every Time*, 5 = *Every Time*. *Does Not Apply* was provided as an option in this question with these responses treated as missing values. Reliability for the measurement of water use behavior was calculated *a priori* and found reliable with a Cronbach's α of .77.

Respondents' self-reported application of water conservation strategies was measured using nine statements asking respondents to indicate if they applied certain strategies by indicating *Yes*, *Unsure*, or *No*. Likelihood of engaging in water conservation behaviors was measured by asking respondents to indicate how likely they were to engage with 14 items using a five-point Likert-type scale, ranging from 1 = *Very Unlikely*, 2 = *Unlikely*, 3 = *Undecided*, 4 = *Likely*, 5 = *Very Likely*. Respondents' likelihood of engaging in certain societal behaviors associated with water conservation was measured using eight items with the same five-point Likert-type scale. Respondents were able to choose *Does Not Apply* to these two behavior questions and responses of *Does Not Apply* were transformed as missing values. The measurements of water conservation behaviors and societal behaviors associated with water conservation was calculated *a priori* and found to be reliable with

Cronbach's α of .83 and .87, respectively. Lastly, respondents were asked to answer demographic questions, including sex, race/ethnicity, age, ZIP code (later converted to rural-urban continuum codes), annual household income, educational level, political beliefs, and participation in a HOA.

In order to ensure face and content validity of the instrument a panel of experts reviewed the survey. The panel of experts included the Chief Executive Officer of the Florida Nursery, Growers and Landscape Association, an assistant professor and Extension specialist in water economics and policy, the Director of the Center for Landscape Conservation and Ecology, the Director of University of Florida Water Institute, the Director and associate director of Center for Public Issues Education, an assistant professor specializing in agricultural communication, an emeritus professor specializing in biosystems and agricultural engineering, a post-doctoral associate, a graduate student, a research analyst, and a research coordinator who had been studying water issues.

A non-probability opt-in quota sampling method was used in this study by collaborating with a public opinion survey research company. Increased public opinion research has been conducted using non-probability sampling methods (Baker et al., 2013). However, using a non-probability opt-in sampling method responses were collected gradually until reaching the specifically set quotas. As a result, participation rates are used in such a sampling procedure instead of response rates (Baker et al., 2013). A total of 932 complete responses were collected from 1,465 invited individuals, resulting in a participation rate of 64%. Quotas were set for the three regions to ensure the sample size in each region was large enough to be representative of the population of interest (Baker et al., 2013). Due to the use of a non-probability sampling method, this study has limitations, including non-participation biases, selection, and exclusion, leading to limited interpretations of the results that can only be applied to the respondents (Baker et al., 2013). In this study, data were not weighted because of the use of quotas *a priori* to identify targeted respondents. The collected data was analyzed using SPSS[®] 22.0 for descriptive statistics to reach the objectives of this study. Chi-square analysis was used to examine the existence of differences among regions.

The demographic characteristics of the respondents can be seen in Table 1. The respondents included 48% females ($n = 97$) and 52% males ($n = 104$) in the Southeast Region; 50% females ($n = 110$) and 50% males ($n = 109$) in the Southwest Region; and 54% females ($n = 277$) and 46% males ($n = 235$) in Central Region. While Non-Hispanic Caucasian/White was the dominant ethnicity group in three regions ($n = 186$, 53% of Southeast Region; $n = 206$, 94% of Southwest Region; $n = 479$, 94% of Central Region), the second largest ethnicity group was Hispanic in Southeast Region ($n = 19$, 10%) and Central Region ($n = 41$, 8%) and African American in Southwest Region ($n = 9$, 4%). A majority of the respondents were aged between 50-79 in all three regions ($n = 158$, 79% of Southeast Region; $n = 181$, 83% of Southwest Region; $n = 349$, 68% of Central Region). As for the rural-urban continuum, 89% of the respondents in Southeast Region ($n = 178$), 56% of the respondents in Southwest Region ($n = 112$), and 99% of the respondents in Central Region ($n = 505$) living in metro areas with 1 million population or more. The income level of \$75,000 to \$149,999 was the level the most respondents fell in all three regions with 50% in Southeast Region ($n = 101$), 54% in Southwest Region ($n = 118$), and 47% in Central Region ($n = 242$). More than 60% of the respondents receiving education of 4-year college degree and Graduate or Professional degree in all three regions: 73% in Southeast Region ($n = 147$), 63% in Southwest Region ($n = 139$), and 67% in Central Region ($n = 343$), specifically. The political beliefs of the respondents in three regions were moderate to conservative with 61% in Southeast Region ($n = 123$), 71% in Southwest Region ($n = 155$), and 70% in Central Region ($n = 356$). Most of the respondents in three regions indicated they were part of HOA with 61% in Southeast Region ($n = 123$), 70% in Southwest Region ($n = 154$), and 74% in Central Region ($n = 379$).

Table 1

Demographic Characteristics

Characteristic	Southeast (<i>N</i> = 201)		Southwest (<i>N</i> = 219)		Central (<i>N</i> = 512)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Sex</i>						
Female	97	48.3	110	50.2	277	54.1
Male	104	51.7	109	49.8	235	45.9
<i>Race</i>						
African American	11	5.5	9	4.1	21	4.1
Asian	2	1.0	4	1.8	8	1.6
Caucasian/White (Non-Hispanic)	186	92.5	206	94.1	479	93.6
Native American	0	0	0	0.0	5	1.0
Other	4	2.0	0	0.0	9	1.8
<i>Hispanic Ethnicity</i>	19	9.5	3	1.4	41	8.0
<i>Age</i>						
19 and younger	0	0.0	0	0.0	0	0.0
20-29	5	2.5	1	0.5	15	3.0
30-39	15	7.5	13	6.1	64	12.7
40-49	17	8.5	17	7.9	74	14.7
50-59	44	22.0	35	16.1	109	21.3
60-69	73	36.5	83	37.8	156	30.4
70-79	41	20.5	63	28.9	84	16.6
80+	6	3.0	7	3.3	9	1.8
<i>Rural-Urban Continuum</i>						
Metro areas 1 million population or more	178	88.6	112	55.7	505	98.8
Metro areas of 250,000 to 1 million population	19	9.5	82	37.4	2	0.4
Metro areas of fewer than 250,000 population	4	2.0	1	0.5	2	0.4
Urban population of 20,000 or more, adjacent to a metro area	0	0.0	11	5.0	0	0.0
Urban population of 20,000 or more, not adjacent to a metro area	0	0.0	1	0.5	0	0.0
<i>Income</i>						
Less than \$49,999	0	0.0	0	0.0	0	0.0
\$50,000 to \$74,999	42	20.9	61	27.9	141	27.5
\$75,000 to \$149,999	101	50.2	118	53.9	242	47.3
\$150,000 to \$249,999	40	19.9	26	11.9	101	19.7
\$250,000 or more	18	9.0	14	6.4	28	5.5
<i>Education</i>						
Less than 12 th grade	0	0.0	0	0.0	1	0.2
High school graduate	13	6.5	15	6.8	27	5.3
Some college, no degree	27	13.4	50	22.8	76	14.8

2-year college degree	14	7.0	15	6.8	65	12.7
4- year college degree	78	38.8	71	32.4	206	40.2
Graduate or Professional degree	69	34.3	68	31.1	137	26.8
<i>Political Beliefs</i>						
Very Liberal	9	4.5	11	5.0	27	5.3
Liberal	59	29.4	34	15.5	88	17.2
Moderate	72	35.8	87	39.7	197	38.5
Conservative	51	25.4	68	31.1	159	31.1
Very Conservative	10	5.0	19	8.7	41	8.0
<i>HOA</i>						
Yes	123	61.2	154	70.3	379	74.0
No	78	38.8	65	29.7	133	26.0

Results

Water Use Behaviors

Existence of differences among three studied regions in high water users' engagement in listed water use behaviors were examined (Table 2). Identified existence of differences among high water users in the three regions occurred in four listed behaviors: "I let my sprinklers run when it has rained or is raining" ($\chi^2(10) = 38.55, p = .000$), "I let my sprinklers run when rain is predicted in the forecast" ($\chi^2(10) = 35.75, p = .000$), "I allow used motor oil to run down a storm drain" ($\chi^2(10) = 25.90, p = .004$), and "I leave the water running in the kitchen when washing and/or rinsing dishes" ($\chi^2(10) = 19.34, p = .036$).

Table 2

Comparative Statistics of Water Use Behavior Engagement

Behaviors	χ^2	<i>p</i>
I let my sprinklers run when it has rained or is raining	38.55	.000
I let my sprinklers run when rain is predicted in the forecast	35.75	.000
I allow used motor oil to run down a storm drain	25.90	.004
I leave the water running in the kitchen when washing and/or rinsing dishes	19.34	.036
I allow soapy water to run down a storm drain	16.52	.086
I flush cooking oil down the toilet	13.73	.186
I hose down my driveway	12.53	.251

Water Conservation Strategies

High water users' application of water conservation strategies was compared among three regions (Table 3). Significant differences among regions were found in four water conservation strategies, including "I use a smart irrigation controller" ($\chi^2(4) = 39.20, p = .000$), "I have low-water consuming plant materials in my yard" ($\chi^2(4) = 18.44, p = .001$), "I use high efficiency sprinklers" ($\chi^2(4) = 11.77, p = .019$), and "I have low-flow shower heads installed in my home" ($\chi^2(4) = 10.94, p = .027$).

Table 3

Comparative Statistics of Water Conservation Strategy Application

Water Conservation Strategies	χ^2	<i>p</i>
I use a smart irrigation controller	39.20	.000
I have low-water consuming plant materials in my yard	18.44	.001
I use high efficiency sprinklers	11.77	.019
I have low-flow shower heads installed in my home	10.94	.027
I use recycled wastewater to irrigate my lawn/landscape	7.49	.112
I use drip (micro) irrigation	5.92	.205
I have water-efficient toilets installed in my home	5.88	.208
I use rain barrels to collect water for use in my garden/lawn	2.95	.566
I have retrofitted a portion of my landscape so that it is not irrigated	0.56	.967

Water Conservation Behaviors

Regional differences in high water users' possible engagement in water conservation behaviors were examined (Table 4). Within the 14 listed water conservation behaviors, regional differences were found in four behaviors: "Install an efficient irrigation technology" ($\chi^2(8) = 22.52, p = .013$), "Reduce your use of natural resources" ($\chi^2(8) = 18.54, p = .018$), "Only water your lawn in the morning or evening" ($\chi^2(8) = 17.51, p = .025$), and "Sweep patios and sidewalks instead of hosing them down" ($\chi^2(8) = 16.82, p = .032$).

Table 4

Comparative Statistics of Likelihood of Engaging in Water Conservation Behaviors

Water Conservation Behaviors	χ^2	<i>p</i>
Install an efficient irrigation technology	22.52	.013
Reduce your use of natural resources	18.54	.018
Only water your lawn in the morning or evening	17.51	.025
Sweep patios and sidewalks instead of hosing them down	16.82	.032
Reduce use of fertilizer if your landscape quality would decrease	14.66	.066
Responsibly dispose of hazardous materials	14.07	.080
Only run the washing machine when it is full	13.74	.089
Modify my landscape so that a portion is not irrigated	8.83	.548
Use biodegradable cleaning products	8.41	.403
Reduce use of pesticides if your landscape quality would decrease	8.24	.410
Keep a timer in the bathroom to help you take a shorter shower	8.13	.421
Only run the dishwasher when it is full	4.80	.779
Avoid purchasing plants that require a lot of watering	4.48	.812
Reduce the number of times a week you water your lawn	4.40	.819

Societal Behaviors Related to Water Conservation

The examination among high water users' differences in potential engagement in societal behaviors related to water conservation in three regions can be seen in Table 5. Only one out of eight listed societal behaviors were found statistically significantly different among three regions. "Visit springs, lakes, state parks, etc., to learn about water issues" was the only societal behavior found different by regions ($\chi^2(8) = 19.29, p = .013$).

Table 5

Comparative Statistics of Likelihood of Engaging in Societal Behaviors

Societal Behaviors	χ^2	<i>p</i>
Visit springs, lakes, state parks, etc., to learn about water issues	19.29	.013
Volunteer for a stream clean up or wetland restoration event	11.93	.154
Vote for candidates who support water conservation	10.07	.260
Vote to support water conservation programs	9.43	.307
Buy a specialty license plate that supports water protection efforts	8.69	.369
Support water restrictions issued by my local government	7.99	.435
Donate to an organization that protects water	7.68	.465
Join a water conservation organization	2.44	.964

Conclusion and Implications

The findings of this study explored the regional differences in Florida high water users with foci on their water use behaviors, application of water conservation strategies, and engagement in water conservation behaviors. Due to the nature of this study, the findings are not generalizable, but can be used as a case study of Florida high water users at the three regions of interest: Southeast, Southwest, and Central Regions that Florida Extension educators working on water conservation should take into account particularly.

The key findings of this study indicated regional differences existed within the studied high water users in their behavioral patterns, which support Monaghan et al.'s (2014) suggestion of using geological location as an audience segmentation strategy. While Benham et al. (2007) indicated a segmented group of audiences with similar characteristics may differ in their behaviors in different regions within a state, such a finding is supported by this study. As high water users have been identified as a specific group of audience with shared demographic characteristics and behavioral patterns (Davis & Dukes, 2014; Huang et al., 2015; Monaghan et al., 2013), they indicated different responses regarding their behaviors based on living in different regions. These findings also align with Kuipers et al.'s (2013) study that an identified type of audience segregated from the broad audience can further be separated into minor groups.

The findings in respondents' engagement in water use behaviors indicated high water users in the three regions performed behaviors related to landscape irrigation, used motor oil management, and dish cleansing differently. Such findings imply needs to cover information about these behaviors differently in Florida's local Extension programs related to water conservation in the studied three regions. As for water conservation strategies, high water users in three regions applied water-conserving irrigation controller, sprinkler, and plant material differently in terms of landscape practices, while difference also occurred in their use of water efficient shower heads in term of indoor practices. Such findings imply different levels of adoption in these four water conservation practices have been made by high water users in the studied three regions.

High water users also showed regional differences when it came to water conservation behaviors. The findings imply high water users in different regions have different levels of willingness to change their behaviors in terms of daily landscape irrigation management, use of natural resources, and outdoor cleaning. Similarly, differences were also found in societal behaviors related to water conservation. The differences found in the societal behaviors of learning from visiting water resources implies high water users in different regions may consider the importance differently at learning through active visit of natural resources.

As audience segmentation was used as the central concept of this study, the findings can be tied back to the conceptual model with components of audiences' demographic characteristics, engagement in water conservation behaviors, and interest in water conservation behaviors. While Huang et al.'s (2015) study

indicated a need to segment high water users out from the general public for water conservation Extension programs, this study sought deeper for specific differences in high water users' demographic characteristics and engagement and interest in water conservation by regions in a state. The overall findings of this study revealed the existence of differences in behavioral patterns of landscape water uses, specific indoor and outdoor cleaning, and learning through visiting natural resources. Therefore, implication can be made that the need to develop water conservation Extension programming differently by regions existed. Moreover, this also implies water conservation Extension programs targeted Florida high water users should be developed differently targeting the specific behavior patterns by regions for improved effectiveness and efficiency (Andreasen, 2006; Huang et al., 2015; Kotler & Roberto, 1989).

Recommendations

As the urban population continues to grow, water conservation will continue to be a critical issue that Extension educators build programs around (Haley et al., 2007; Wagner & Kuhns, 2013). High water users have been identified as a group of urban audiences that Extension educators have difficulty impacting (Monaghan et al., 2013). This study explored this specific audience with more depth in differences in behavior patterns within the group. The findings of this study provided insight into how Extension educators should pay attention to regional differences in their target audiences when developing Extension educational programs. It is expected that program effectiveness can be improved by tailoring materials relevant to local high water users' needs and behavior patterns (Adhikarya, 1994; Kuipers et al., 2013).

Although high water users approach their water use and water conservation behaviors differently than the general public (Huang et al., 2015), specific behavioral similarities and differences among high water users living in different regions were identified in this study. Therefore, educational programs targeting high water users should be developed and distributed to two levels: a) the similarity identified in behavior patterns can be included as common suggestions that state Extension educators can use in a broader spectrum; and b) the identified differences in behavior patterns should be used by Extension educators working in the studied regions to reframe the materials they currently have. The key recommendation of this study is to Extension programming that Extension educators need to understand that audiences may respond to the list of recommendations differently by region. For example, Extension educators work at Orlando area and Miami/Fort Lauderdale area may have to promote different water conservation behaviors to their high water user audiences based on their tendency to engage in certain water conservation behaviors. As a result, addressing and utilizing such the regional behavioral differences may enhance positive impacts on local audiences.

Future research is recommended based on the findings of this study. As regional differences in behavior patterns were identified in this study, further examination can be conducted using qualitative methods to understand the audiences in depth about personal factors associated with their water use. Existing water conservation programs targeting high water users can be evaluated as future studies to examine challenges, obstacles, and promising factors of the programs. The examination of existing programs can include the program development strategies recommended in this study to further confirm the findings. For example, evaluations can be conducted in water conservation programs implemented in different counties targeting high water users. The results from the evaluations can then be compared to see if programs were developed differently tailored to local audiences' needs and interests. Moreover, existing programs can be revised based on the recommendations of this study and then evaluated to explore the improvement of programmatic impact. By understanding this, the sustainability of state water resources would be enhanced by receiving increased high water users' support of water conservation.

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Cognitive Dissonance: A Theoretical Perspective to Explain Intentions to Conserve Water

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Abstract

Water is a scarce resource in Florida and to reduce the stress on water resources in Florida, and make the availability of water more sustainable, engagement in water conservation among the residents of Florida is an immediate need. This study examined how the future intentions of high water users in Florida to conserve water outdoors was improved and influenced by cognitively dissonant attitudes and behaviors. The independent variables used in the study were: Government trust, current water conservation practices, political beliefs, and homeowners' associations (HOA) Membership. Bivariate correlation coefficient indicated that behavioral intentions to conserve water have positive significant correlation with government trust and current water conservation behaviors, and negative significant correlation with political beliefs and association to homeowners' association, which shows that higher trust in government and habit of water conservation promote water conservation, while conservative political belief and HOA membership restricts water conservation. The independent variables (government trust, current water conservation practices, political beliefs, and HOA Membership) also significantly predicted 30% of the variation in water conservation behavioral intentions. Level of current water conservation behavior engagement had the highest effect. Extension educators are encouraged to consider cognitive dissonance among their target audiences as cognitive dissonance can promote water conservation.

Introduction

Water is a very important natural resource that supports human life, sustains ecological balance, and supports economic activities around the world (Hurlimann, Dolnicar, & Meyer, 2009). Water has been used by human beings for a variety of purposes including daily consumption, kitchen and daily ablutions, maintenance of lawns and landscapes, recreation, industrial and transportation needs, hydroelectric services, and maintenance of plants and natural resources (Marandu, Moeti, & Joseph, 2010). An increased disparity between availability and sustainable water supply needs have been recognized in recent decades due to a surge in population growth, urbanization, industrialization, increased agricultural irrigation, and climate change (Adams et al., 2013; Jogensen, Gaymore, & O'Toole, 2009; Qaiser, Ahmad, Johnson, & Batista, 2011; Wolters, 2014). All of these factors have contributed in making water a scarce resource around the world (Adams et al., 2013; Wolters, 2014). Considering the stress on water resources in the U.S., it has been predicted by Spencer and Altman (2010) that by 2050 one-third of all U.S. counties will face the issue of water scarcity.

Due to pleasing landscapes and serene beaches, Florida has seen population growth (Marella, 2014). From 1950 to 2010, the population of Florida increased by 16.03 million (580 percent) (Marella, 2014). Due to cultural norms in Florida for pleasing landscapes, residents pump gallons of water to their lawns and landscapes; a number way beyond that required by plants (Baum et al., 2005; Haley, Dukes, & Miller, 2007; Monaghan, Ott, Wilber, Gouldthorpe, & Racevskis, 2013). Residents in Florida consume 71% of the total public supplied water just for irrigation of their lawns and landscapes (Baum et al., 2005; Haley et al., 2007). The cultural norms for pleasing landscapes, increased population, water pollution, urbanization, and industrialization have caused water withdrawals (fresh and saline) to increase in Florida by 465 percent (12,334 Mgal/day) in a period of 60 years (1950-2010) and made water a scarce resource in Florida, with increased stress on water bodies (Marella, 2014).

In order to reduce the stress on water resources in Florida, and make the availability of water more sustainable, engagement in water conservation among the residents of Florida is an immediate need for all water

management authorities (Fielding et al., 2013; Gregory & Di Leo, 2003; McCready, Dukes, & Miller, 2009; Qaiser et al., 2011). In order to manage the limited water resources and encourage water conservation, Extension educators need to understand not only how people use water, but also the cognitive and behavioral aspects of water conservation (Gorham, Lamm, & Rumble, 2014; Gregory & Di Leo, 2003; Lamm, Lamm & Carter, 2015; Leal, Rumble, & Lamm, 2015). The most important group to target for promotion of water conservation would be high water users, as they utilize most amount of water (Huang, Lamm, & Dukes, in press). Due to limited availability of funding and resources (Peters, & Franz, 2012), it is more feasible to target high water users rather than general population, as most water will be saved by changing water use behavior of high water users.

Many studies have considered financial factors and econometric models to explain water use and conservation. Financial factors include water price (Terrebonne, 2005), incentives including rebates on use of water saving technologies (Campbell et al. 2004; Renwick & Green, 2000), and characteristics of property owned (e. g. size of the house, age of the house, lot size, availability of lawn and pools) (Baum et al., 2005; Campbell et al., 2004; Haley et al., 2007; Olmstead et al., 2003; Syme et al., 2004). Econometric models, such as one Renwick and Archibald (1998) proposed, indicated water use restrictions and price of water utilities had a direct influence on water consumption, whereas Aurora et al. (2008) found water demand for urban residents could be explained by price of water utility bills, and governmental programs such as water restrictions and incentives to use smart irrigation appliances. A vast literature on the other side identified that water conservation can be better explained through nonfinancial factors such as attitude (Clark & Finley, 2007), values (Buttel, 1987), behavioral intentions (Clark & Finley, 2007; Lam, 1999), cognitive schemas (Dickerson, Thibodeau, Aronson, & Miller, 1992), and norms (Clark & Finley, 2007; Kumar Chaudhary & Warner, 2015; Lam, 1999). Even though economic factors (dollars saved) have a direct influence on consumption of water resources, they alone may not be enough to bring change to a complex environmental behavior change such as water conservation (Gardner & Stern, 1996). This research focuses on the nonfinancial factors that may explain behavioral intentions. A thorough understanding of nonfinancial factors that influence the water conservation behaviors of an individual may assist Extension educators and water authorities in promoting water conservation and assist in the design of effective water conservation educational programs (Gregory & Di Leo, 2003; Huang et al., in press). This research fits within priority area one (*Public and Policy Maker Understanding of Agriculture and Natural Resources*) of the national research agenda (Doerfert, 2011) as it focuses on increasing understanding of public and policy makers associated importance with and sustainability behaviors related to water.

Theoretical Framework

This study utilized cognitive dissonance theory proposed by Festinger (1957). Cognitive dissonance theory is widely studied in social psychology to explain the relationship between attitude and behavior and also the adoption of specific behaviors over other alternative behaviors (Metin & Camgoz, 2011). According to cognitive dissonance theory, an individual can have a pair of cognitions that may be relevant and irrelevant to each other. Two relevant cognitions either agree with each other, also referred to as consonant, or disagree with each other, referred to as dissonance (Harmon-Jones, & Mills, 1999). In the situation of cognitive dissonance a person feels psychologically uncomfortable and is motivated to reduce the dissonance by either removing the opposing knowledge/attitude/behavior, accepting new consonant cognitions, reducing the importance of opposing knowledge/attitude/behavior, or increasing the importance of newly adopted consonant cognitions (Cummings & Venkatesan, 1976; Dickerson, Thibodeau, Aronson, & Miller, 1992; Festinger, 1957; Greenwald & Ronis, 1978; Harmon-Jones & Harmon-Jones, 2008; Harmon-Jones & Mills, 1999).

The magnitude of cognitive dissonance an individual has towards an attitude/behavior is equal to the total number of dissonant cognitions divided by the sum of the total number of dissonant cognitions and total number of consonant cognitions. This ratio is referred to as a dissonance ratio (Harmon-Jones & Harmon-Jones, 2008;

Harmon-Jones, & Mills, 1999). An example of cognitive dissonance could be if an individual holds pro-environmental behavior such as water conservation in high regard but currently irrigates their lawns during rainy days. Cognitive dissonance is created as a result of negative emotions related to wasting water. In order to resolve the negative emotions and bring their beliefs and action into alignment to reach consonant, the individual would have to change their behavior by cutting off irrigation during rainy days (Vining & Ebreo, 2002).

Reason for Behavior Change

According to Orams (1995), cognitive dissonance can be caused by four situations: when an individual has a disagreement with others; when an individual is forced to comply (for example water restrictions); when there is a situation where an individual needs to make a decision such as whether to turn off water during a rainy day or not; or when an individual is exposed to information that contradicts his/her personally held beliefs towards a specific behavior (such as water conservation).

When people change their behavior because of cognitive dissonance, they start developing a sense of efficacy and believe there may be benefits in changing their behavior (Markowitz & Doppelt, 2009). They enter the deliberation stage of change where they engage in cognitive deliberation about a desired behavior. Deliberation could include a cost-benefit analysis related to conserving water in terms of self-satisfaction, approval from others, and monetary savings related to current engagement in water wastage behavior (Markowitz & Doppelt, 2009). At the time of cost-benefit analysis people often do a self-assessment related to making the desired change based on their capacity and whether their social peers approve of their behavior (Markowitz & Doppelt, 2009). If the benefit outweighs the cost, then people decide to change their behavior by adopting water conservation behaviors (Markowitz & Doppelt, 2009).

Another explanation for behavior change related to cognitive dissonance is the moral standards or norms that guide the behavior (Aronson, 1997; Thøgersen, 1999). Cognitive dissonance threatens the self-perception of an individual as a morally reliable person only if he/she holds some strength of moral norms for certain behavior like water conservation. If an individual has low or no moral beliefs about water conservation, then water wastage cause little tension. However, if an individual has high moral beliefs related to water conservation then they may change their behavior as a result of dissonance (Thøgersen, 2004).

Application of Cognitive Dissonance Theory to Explain Environmental Behaviors

To test cognitive dissonance theory Kantola, Syme, and Campbell (1984) conducted an experiment in Australia to encourage a reduction in electricity consumption. In order to create cognitive dissonance, Kantola et al. (1984) used a feedback method to inform participants that they are consuming a higher amount of electricity compared to what they indicated as their willingness to save energy. They created four groups, where all groups received tips on how much electricity they were consuming except the control group. The differences among the groups were: first group received cognitive dissonance feedback; second group received feedback that they use more electricity without causing dissonance; third group received just the tip; and the fourth group was control group. After two weeks of intervention, the cognitive dissonant group saved a significantly more amount of electricity compared to the other three groups, while in the third and fourth weeks, the cognitive dissonant group saved significantly more electricity compared to only the control group.

In order to encourage water conservation behaviors by reducing the shower time among female swimmers, Dickerson et al. (1992) used cognitive dissonance theory. Dickerson et al. (1992) conducted an experiment where the treatment group had to make a public commitment to save water and the control group did not. After the experiment, the treatment group consistently reduced their shower time compared to the control group

because of dissonance or tension that was created by engaging in a public commitment to save water and being reminded of their water wastage behaviors.

Through the application of cognitive dissonance theory, Thøgersen (2004) explained the consistency and inconsistencies in the environmentally responsible behaviors exhibited by people. Thøgersen (2004) found that people try to behave consistently with regard to their cognitions, however this behavior varies when people perceive dissimilarity between the existing behavior and importance of behaving normally in order to be responsible towards the environment. Thøgersen (2004) also found the effect of dissonance was more visible when people practiced simple behaviors compared to complex behaviors. According to Thøgersen (2004) Cognitive dissonance may be unpleasant, but the unpleasantness of the sacrifices needed in order to behave in an environmentally responsible way may easily be worse, in which case most people adopt other than behavioral means to resolve the dissonance or simply choose to live with their perceived behavioral inconsistency. (p. 101)

In a meta-analysis of 87 published reports containing 253 experiments testing the pro-environmental behavior, Osbaldiston and Schott (2011) found experiments using the cognitive dissonance theory provided the largest overall effect size ($g = 0.93$) on pro-environmental behaviors compared to the use of other psychological factors such as goals, social modelling, rewards, prompts, justification, commitment, feedback and instructions. In a study that empirically tested the ecological citizenship concept for exploring the relationship between the environmental attitudes and environmental behavior, Martinsson and Lundqvist (2010) found distinct patterns in four citizen group cognitions. The believers (had a positive attitude towards the environment and followed ecological practices that promoted a green environment) and diehards (had a negative attitude towards the environment and followed no ecological practices that promoted a green environment) showed consonance between environmental attitudes and behaviors. Believers were green and scored high on environmental attitudes and behavior, while diehards were grey and scored consistently low on environmental attitude and behavior (Martinsson & Lundqvist, 2010). The other two groups: hypocrites (had a positive attitude towards the environment but followed no ecological practices that promoted a green environment) and coverters (had a negative attitude towards the environment but followed ecological practices that promoted a green environment) showed dissonance between environmental attitudes and behavior. Hypocrites scored high on green environmental attitudes and scored low on green environmental practices, while coverters scored low on green environmental attitudes and scored high on green environmental behavior (Martinsson & Lundqvist, 2010).

Current Water Conservation Behavior/Habits

In a meta-analysis, Ouellette and Wood (1998) showed that regular past behaviors/habits affect the future behavior of an individual directly with no dependencies on other variables such as attitudes, subjective norms, intentions, and perceived behavioral control. Regular behavior/habits can be defined as “the result of automatic cognitive processes, developed by extensive repetition, so well-learned that they do not require conscious effort” (Ronis, Yates, & Kirscht, 1989, p.219). Habits can be classified as purely habitual, where the behavior is repetitive and involuntary with no involvement of cognitions such as washing clothes and watering of lawn (Aitken, 1992) or purely cognitive, where an individual has control over the behavior and uses his/her cognitive decision to perform a behavior such as installation of a rain barrel to conserve water (Svenson, 1992). Aarts et al. (1998) found that habits can supplement the evaluating decision of an individual to form specific attitude towards the behavior in question. An individual who is habitual in their current engagement in water conservation behaviors is more likely to engage in the water conservation behavior in the future (Barr & Gilg, 2007).

Political Beliefs/Ideology

Political beliefs/ideology is an important characteristics that influences individuals' environmental views and actions (Larson et al., 2011; Schaaf, Ross-Davis, & Broussard, 2006). Political views can explain the attitudes of public, especially when efforts are made by the government to ensure availability of water (Larson & Santelmann, 2007). In the U.S., political beliefs are typically spread on a continuum between liberal and conservative, where people with liberal views associate importance with equality, humanitarianism, public action (Larson, 2010), and emphasize the welfare of a whole community (McConochie, 2011). Conservatives emphasize law and order, tend to deny human induced climate changes, and are less concerned about environmental protection than their liberal counterparts (Larson, 2010; Larson et al., 2011; McConochie, 2011). Liberals have more pro-environmental views than conservatives (Johnson, Bowker, & Cordell, 2004; Larson et al., 2011). Pro-environmental behaviors are often influenced by the values and beliefs an individual holds towards individualistic versus collective actions (Larson et al., 2011). Conservatives are more individualistic than liberals and oppose the intervention of government as it relates to water consumption and pricing (Larson et al., 2011).

Government Trust

Institutional trust is required to encourage water conservation behavior among the general public. Research has shown intentions to conserve water increase if government support for water conservations efforts increase (Heiman, 2002; Huang & Lamm, 2015; Jogensen et al., 2009). It can be said that, if an individual trusts water authorities and perceive the government is also making efforts to ensure a sustainable water supply then willingness of an individual to save water increased (Jogensen et al., 2009).

Membership in a Homeowners' Association

Homeowners' associations (HOAs) are the governing body created to oversee homeowners in a community. HOAs make decisions for the betterment of the community, including decisions about management of community lawns/landscapes (Dyckman, 2008; Turner, & Ibes, 2011). HOAs also act as liaisons between the community members and township planning department (Austin, 2004). Each HOA has its own rules and regulations, which the members of community have to abide (Austin, 2004; Dyckman, 2008). Based on their quasi-governmental structure, HOAs can either promote or inhibit water conservation (Dyckman, 2008). HOAs can mandate water conservation behaviors of community members by enforcing post-construction controls, and amendments to conditions and restrictions to landscape management (Dyckman, 2008). However, HOAs were traditionally regarded as hindrance to water conservation but could be utilized as an entry-point to reduce water demand among residents (Dyckman, 2008; Turner, & Ibes, 2011). According to Cook, Hall, and Larson (2011) for residential landscape there is gap in "the link between social drivers and ecological outcomes of management decisions" (p.19) and future research is needed to fill gap by studying HOAs.

Purpose and Research Questions

The purpose of this study was to understand how the future intentions of high water users in Florida to conserve water outdoors were improved and influenced by cognitively dissonant attitudes and behaviors.

Specific research questions were:

- How do current water use behaviors influence future intentions to conserve water?
- How do political beliefs of high water users dictate water conservation behavioral intentions?
- How does perceived support from the government influence water conservation behavioral intentions?
- How does membership in an HOA affect water conservation behavioral intentions?

Methodology

This cross-sectional study is part of a larger research project undertaken to understand the public opinion of high water users in Florida towards water conservation and other water related issues. The purposive sample ($N = 932$) for the study was acquired by a professional survey administration company. The target population had specific characteristics: have an irrigated lawn/landscape on their property, they control the irrigation, they hire an outside landscape company to maintain their property, and they belong to one of the four metropolitan counties of Florida which are reputed for high water consumption. The rationale for the use of a purposive sample of high water users was that in the era of tight budget and limited resources (Peters, & Franz, 2012), it is better to concentrate water conservation programming efforts to the population that consumes the most water, rather than targeting the general population.

The dependent variable of the study was behavioral intentions to conserve water, which was conceptualized as the perceived future actions/activities of an individual that promotes the sustainable availability of water, especially changes in lawn/landscaping irrigation behaviors. The behavioral intentions were captured using eight statements measured on a five point Likert-type scale (1 = *very unlikely*, 2 = *unlikely*, 3 = *undecided*, 4 = *likely*, 5 = *very likely*, and 6 = *not applicable*). Some examples of statements were: *Only water your lawn in the morning or evening*; *reduce the number of times a week you water your lawn*; *modify my landscape so that a portion is not irrigated*. The index score for behavioral intentions was calculated by taking the average of the eight statements, while respondents who selected not applicable were excluded from the analysis.

Among independent variables, the current water conservation behavior was measured using 10 statements measured on a three point Likert-type scale (1 = *yes*, 2 = *unsure*, and 3 = *no*). Some current water conservation behaviors were: *I avoid watering my lawn in the summer*; *I let my sprinklers run when it has rained or is raining*; *I have low-water consuming plant materials in my yard*; *I use a smart irrigation controller*. For further analysis of the current water conservation behavior variable, the results were dummy coded with baseline coded as 0 (not following the water conservation behavior), and the remaining coded as 1 (following the water conservation behavior). The residents who selected unsure were excluded from further analysis. The index for current water conservation behavior was calculated by summing the responses to the ten statements. Therefore, the responses could range from zero to 10.

The political beliefs/ideology variable was measured using a single statement with a five-point Likert-type scale (1 = *very liberal*, 2 = *liberal*, 3 = *moderate*, 4 = *conservative*, and 5 = *very conservative*). For further analysis, very liberal and liberal were recoded as liberal and very conservative and conservative were coded as conservative and moderate was made missing. In order to utilize this variable in multivariate analysis, it was dummy coded with liberal as the baseline with a code of zero and conservatives coded as one.

Government trust was measured using three statements measured on a five point Likert scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *neither disagree nor agree*, 4 = *agree*, and 5 = *strongly disagree*). The government trust statements were: *I feel I have choice to use the strategies provided by the government in order to help the environment*; *the government gives me the freedom to make my own decisions in regards to the environment*; *I feel I have the choice to participate in the environmental programs established by the government*. The index for government trust was calculated by taking the average of the three statements. The last independent variable, membership in an HOA was measured using a single statement asking whether or not they were a member of an HOA measured on a yes (1)/no (0) scale. Not being a member of an HOA was coded as zero and being a member of an HOA was coded as one.

Data for the study was collected using an online questionnaire. The face and content validity of the instrument was established by a panel of experts with specialization in horticulture, agricultural engineering, and social

sciences. After expert panel review, the instrument was pilot tested. Post-hoc reliability was calculated using Cronbach's alpha and found satisfactory for both institutional (government) trust (0.80) and behavioral intentions (0.77). The data was analyzed using Statistical Package for Social Sciences (SPSS, version 22.0). Means and standard deviations were used to define the variables. Bivariate correlations were used to examine associations among all the variables used in the study. The associations were interpreted using Davis' (1971) convention with .01 to .09 indicating a negligible relationship, .10 to .29 indicating a low level relationship, .30 to .49 indicating a moderate relationship, .50 to .69 indicating a substantial relationship, and greater than .70 indicating a very strong relationship. Linear multiple regression (Field, 2013; Tabachnick & Fidell, 1996) was used to see the combined effect of the independent variables on behavioral intentions and for assessing the effect sizes. All the assumptions of liner multiple regression (Field, 2013; Tabachnick & Fidell, 1996): multi-collinearity, whether the residuals were independent, and assumptions of linearity were checked and data satisfied all of the assumptions.

Results

After removing the missing values for all variables, 282 responses were utilized in the final analysis. The descriptive statistics indicated respondents were either likely or very likely to save water in the future, respondents either agreed or strongly agreed about their trust and freedom from government to participate in pro-environmental behaviors (Table 1). For current water conservation practices, almost half of residents followed water conservation practices, while the other half did not; the sample consists of more conservatives (61%); and a majority of respondents were members of their HOAs (72%) (Table 1).

Table 1.

Descriptive Statistics for Dependent and Independent Variables

Variable	<i>M</i>	<i>SD</i>
Behavioral intentions ^a	3.79	.70
Government trust ^b	3.29	.86
Current water conservation practices ^c	4.07	2.04

Note. ^aScale: 1 = *very unlikely*, 2 = *unlikely*, 3 = *undecided*, 4 = *likely*, 5 = *very likely*; ^bScale: 1 = *strongly disagree*, 2 = *disagree*, 3 = *neither disagree nor agree*, 4 = *agree*, and 5 = *strongly disagree*; ^cScale: Summed score of engagement in ten water conservation practices ranging from zero = does not engage to 10 = engages in all ten practices.

The results of the bivariate correlations indicated behavioral intentions to conserve water have positive significant moderate correlations with government trust and current water conservation behaviors, and negative significant low correlations with political beliefs and association to homeowners' association (Table 2). These findings exhibited that if respondents have trust in government then they are more likely to save water in the future. Respondents who have a habit of water conservation or are currently following water conservation behaviors are more likely to conserve water in the future. For political beliefs, if respondents had conservative political beliefs they were less likely to save water in the future, while on the other side if respondents had liberal political beliefs they were more likely to save water in future. Last, if a respondent belonged to an HOA then the respondent was less likely to save water in the future.

Table 2

Bivariate Correlation Among All Study Variables

	Behavioral Intentions	Government trust	Current water conservation behavior	Political beliefs	HOA Membership
Behavioral Intentions	1.00	.33**	.43**	-.20**	-.12*
Government trust		1.00	.002	-.30**	-.07
Current water conservation behavior			1.00	-.06	-.06
Political beliefs				1.00	.17*
HOA Membership					1.00

Note. ** $p \leq 0.001$; * $p \leq 0.05$; Strength of relationships (Davis, 1971): .01 - .09 = *Negligible*, .10 - .29 = *Low*, .30 - .49 = *Moderate*, .50 - .69 = *Substantial*, > .70 = *Very strong*.

The regression model explaining behavioral intentions to conserve water was significant ($R^2 = 0.30$, $F(1, 277) = 29.59$, $p \leq .01$) explaining 30% of the variation. Among the independent variables, only government trust ($b = 0.24$, $t = 5.63$, $p \leq .01$) and current water conservation practices ($b = 1.45$, $t = 8.34$, $p \leq .01$) were significant in explaining water conservation intentions (Table 3).

Table 3

Summary of Linear Multiple Regression

Variable	<i>b</i>	<i>p</i>
Current water conservation behavior	.42	≤ 0.01
Government trust	.30	≤ 0.01
HOA Membership	-.06	.26
Political beliefs	-.07	.16

Note. $R^2 = 0.30$.

Conclusions, Implications and Recommendations

In order to explain the behavioral intentions to conserve water, most researchers have utilized either the theory of planned behavior (Armitage & Conner, 2001; Clark & Finley, 2007; Trumbo & O'Keefe, 2011), theory of reasoned actions (Marandu et al., 2010) or moral/norm related theories such as the norm activation model (Monroe, 2003). The application of cognitive dissonance theory is very limited in explaining the water conservation intentions except for the well-known experiment by Dickerson et al. (1992) research conducted with female swimmers. The current study fills this gap in the literature by applying cognitive dissonance theory to explain behavioral intentions to conserve water in the future using a non-experimental situation. However, it is advised that the findings of the study be interpreted cautiously due to utilization of a convenience sample. For this study we collected data only from high water consuming areas and used a non-probability sampling opt-in panel. The results may be different if data was collected from a random sample of the general population.

When it comes to complex behaviors like water conservation, people prefer convenient and familiar behaviors compared to more complex behaviors (Syme, Nancarrow, & Seligman, 2000). The results of this study revealed

that it is more likely for residents to conserve water if they are habitual or currently following the water conservation behavior. When residents report the intentions to conserve water but habituated to waste water, cognitive dissonance enforced the need to be consistent with their behaviors by changing their water wastage habits to water conservation habits (Thøgersen, 2004).

When it comes to governmental trust, if an individual realized the government was providing freedom to its citizens while making efforts to sustain an available water source, residents who were not saving the water felt cognitive dissonance and tried to modify their behaviors in order to align with the governmental or social norms (Heiman, 2002; Jogensen et al., 2009). People with liberal political beliefs were more supportive of pro-environmental behaviors such as water conservation and this belief is further confirmed by the current study (Larson et al., 2011; Larson, 2010). It is evident that conservatives with willingness to save water in the future feel cognitive dissonance, and try to increase their conservation of water rather than doing nothing (Larson, 2010).

When people live in a community, which is part of an HOA they are obliged to follow the rules and regulations set by their HOA with limited control of lawn/landscaping decisions. As a result of pro-water conservation behaviors and a desire to reduce cognitive dissonance, community members can try to accommodate the pro-water conservation behaviors in their landscaping agendas, as managers of HOAs are composed of community members (Dyckman, 2008; Turner, & Ibes, 2011).

Based on the results of this study, it is evident that cognitive dissonance can be successfully utilized to explain water conservation behaviors. It is recommended that Extension educators utilize the cognitive dissonance theory to encourage water conservation among their target audiences. For example, Extension educators can do public commitment ceremonies where residents commit to save water in the future. After the commitment sessions, in the upcoming months based on actual utilization of water, Extension educators can provide feedback using utility bills indicating that you committed to save water but currently have not reduced consumption. The continuous feedback would encourage the dissonance among residents and would encourage residents to conserve water in order to reduce the cognitive dissonance (Kantola, Syme, & Campbell, 1984).

For this study we utilized the convenience sample of high water users, and recommend that future researchers apply the cognitive dissonance theory to study water conservation behavior of the general population through a random sample. Future researchers are also encouraged to use additional variables than those used in this study such as morals of individuals (Aronson, 1997; Thøgersen, 1999; Thøgersen, 2004), as strength of moral norms can guide certain behaviors such as water conservation. Future researchers are also encouraged to study the relationship between independent variables used in the current study and actual behavior adopted, as it is well indicated by the literature that there is always a discrepancy between behavioral intentions and actual behavior adopted (Hurlimann et al., 2009; Truffer, Markard, & Wustenhagen, 2001).

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Discerning Gaps between Public and Decision Maker Views of Agricultural Water Use to Inform Practice

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Abstract

Water use has become increasingly contentious as the population grows and water resources become scarcer. Recent media coverage of agricultural water use has brought negative attention potentially influencing public and decision makers' attitudes towards agriculture. Negative perceptions could result in uninformed decisions being made that impact the agricultural industry such as increased regulation and decreased permitting. Without adequate water resources, the agricultural industry will be unable to enhance or even sustain current production. This study uses knowledge gap theory to identify and compare public and local decision makers' attitudes towards and perceptions of agricultural water use to inform educational programs and communication approaches that could assist in educating and informing about agricultural water use. The findings revealed the public had a positive attitude towards agricultural water use, which significantly differs from decision makers, who were neutral. The public is also more interested in learning about water issues, while decision makers appear to be more apathetic. The findings imply there is a need for education and communication in this realm, particularly with decision makers that are working closely with water authorities in driving water policy.

Introduction

“The mass media plays a major role in shaping America’s agenda” (Whitaker & Dyer, 2000, p. 125). According to Kingdon (2003), the media drives the importance of an issue by highlighting specific events while downplaying those of equal importance. Therefore media coverage, such as the LA Times stating, “708 gallons of water were used to make this plate” (Kim, Schleuss & Krishnakumar, 2015) and radio personalities on KFI AM 640 (the most listened to talk radio program in the United States including approximately 1.2 million weekly listeners) touting “the farming industry is using 80 percent of the water and they’re 2 percent of the economy, justify that!” (Kobylt, 2015) is bringing agricultural water use under public scrutiny. While these media statements refer to the battle over water in California as it faces extreme drought and the media wrestles with arguments both for and against agricultural water use, other states are facing a similar future. In Florida, where there is a perceived abundance of freshwater resources, “high levels of commercial, real estate, and agricultural development have caused withdraws to increase over time, putting pressure on natural resources” (Odera, Lamm, Dukes, Irani, & Carter, 2013, p. 4).

The United States Geological Survey (USGS, 2010) identified that between 1970 and 2000 withdrawals from freshwater sources in Florida increased from 5.6 billion gallons per day (bgd) to 8.2 bgd. Then, from 2000 to 2010 water use decreased to 6.3 bgd (USGS, 2010) indicating the state’s agricultural sector is taking action to preserve water from a myriad of fronts. One way this has been accomplished is through the adoption of best management irrigation practices ensuring only the minimal amount of water needed for crops is applied (Schaible & Aillery, 2012).

However, there is a widespread public lack of knowledge regarding water quantity and quality issues broadly (Lamm, Lamm, & Carter, 2015), which only serves to foster biased perceptions of water use. Agricultural settings are often targeted because the general public associates agriculture with large-scale water use due to societal perceptions and media portrayal of industrial agriculture (Whitaker & Dyer, 2000; Gaines, 2014). As a

result of media coverage, decision makers may believe their constituents feel a certain way, when in reality they may not hold the strong views suspected.

It is important for decision makers, both elected officials and non-elected personnel, to understand and have a high sense of knowledge when it comes to agricultural water use (Molden, 2007), as they “represent the structure in which water related views and conversation occurs” (Lamm et al., 2015, p. 237). Local decision makers in particular are central to the monitoring and regulation of water related policies (Molden, 2007) working hand in hand with the state’s five water management districts under the Florida Department of Environmental Protection (DEP). This is no simple task given there were over 115 rules regulating water issues managed by the DEP (Florida Department of Environmental Protection, 2014).

In order to avoid future water conflicts, water concerns need to be understood and recognized by all interest groups including the general public and decision makers (Young & Dhanda, 2013). These groups must understand one another and work together if society wants to develop and implement sustainable solutions to the widespread water problems that are increasing over time (Odera et al., 2013). Therefore, research designed to understand how both the general public and decision makers perceive agricultural water use, and how the two differ, can offer many insights for agricultural educators and aligns with priority one of the National Research Agenda: American Association for Agricultural Education 2011 – 2015 (Doerfert, 2011). By identifying similarities and differences between the general public and decision makers, agricultural educators and communicators will begin to identify ways in which to resolve potential issues through improved education, communication and messaging designed for both groups.

Theoretical Framework

The study presented here was based on knowledge gap theory proposed by Tichenor, Donohue, and Olien (1970). Knowledge gap theory posits there are two groups when it comes to understanding social, political, or other publically relevant content: a group with higher levels of knowledge and a group with lower levels of knowledge. The theory assumes that as a topic is given more exposure, those parts of the population with higher socio-economic status (SES) will acquire information at a faster rate than the lower SES population (Tichenor et al., 1970).

Historically, the groups were found to be divided based on SES and levels of education (those with higher knowledge levels had higher levels of education). Further research to explain knowledge gap theory has also examined motivational factors. For example, a person’s behavioral involvement with an issue (political campaign involvement, interpersonal communication, and attending lectures) has demonstrated a strong relationship to knowledge acquisition (Kwak, 1999). In the motivation-contingency model theory, it is expected that if one’s motivation level is high, the effect of education on knowledge acquisition will be cancelled out; thereby resulting in a small knowledge gap between high and low SES groups among highly motivated people (Kwak, 1999). For example in Ettema and Kline’s study (1977), it was suggested that when the low SES group’s motivation was higher than that of the high SES group, there was a reversed knowledge gap.

In general, individuals belonging to a group that holds higher positions of status in society benefit from greater access to educational materials and social resources (Kraus & Callaghan, 2014). High status individuals also tend to hold public office more than their low status counterparts (Dornhoff, 1998) and state legislators tend to be far more educated than their constituents (Hu, 2011). This level of higher education indicates an expanded and more differentiated life space, including a greater number of reference groups, more interest in, and awareness of science and other public issues, and more exposure to content in these areas (Tichenor et al., 1970).

Based on previous research, knowledge gaps between the general public and decision makers related to their knowledge of and perceptions of agricultural water use should exist. These gaps should be attributed to decision makers having a higher level of behavioral involvement with water due to their higher social status, higher level of education, and unique access to information needed to make decisions within their communities (Kwak, 1999). Specifically, decision makers are expected to have a higher level of involvement due to their unique access to decision-making power on matters related to environmental policy (Dornhoff, 1998). Higher levels of involvement should therefore lead to more knowledge related to water issues (Tichenor et al., 1970).

Purpose and Research Objectives

The purpose of this study was to examine whether the general public and decision makers differed in their perceptions regarding agricultural water use. The study was driven by the following research objectives:

1. Describe the general public and decision makers' attitude towards and perceptions of agricultural water use.
2. Determine if differences in attitude towards and perceptions of agricultural water use exist between the general public and decision makers.
3. Describe the general public and decision makers' preferred ways of learning about agricultural water use.

Methods

An online survey research design was employed to reach the objectives of the study. The population of interest was Florida residents' age 18 or older and local decision makers in Florida consisting of, but not limited to, local county commissioners, county clerks and county managers. The survey instrument was based on the 2012 RBC Canadian Water Attitudes Study (Patterson, 2012). The original instrument was adapted to fit the state audience and researcher-developed questions specific to agricultural water use were added. Given this research was part of a larger study, five sections of the survey instrument were germane to the findings: attitude towards agricultural water use, perceptions of agricultural water use, preferred subject matter learning areas, preferred learning modes and demographics.

Prior to disbursement, a panel of experts that included faculty and members of the agricultural industry involved in water quality and quantity issues, agricultural water issues, and public opinion research reviewed the survey instrument. The panel included the Associate Director of UF/IFAS Center for Public Issues Education, the Associate Director of the Office of Agriculture Water Policy at the Florida Department of Agriculture and Consumer Services, the Director of Government and Community Affairs at the Florida Farm Bureau, the Chief Executive Officer at the Florida Dairy Farmers Association, and an evaluation specialist with knowledge in survey design and construction.

A public opinion survey research company, Qualtrics, was consulted to obtain an opt-in non-probability based sample. Qualtrics sent a link allowing access to the developed survey to Florida residents representative of the state population based on the 2010 Census data. An initial pilot test of 50 respondents was conducted and the pilot data for the scales was analyzed to ensure reliability. All of the scales were found to be reliable with a Cronbach's $\alpha > .70$. Therefore, no changes were made to the instrument.

Qualtrics sent the survey link to a total of 582 residents. A response rate of 89% ($N = 525$) was obtained. Potential exclusion, selection, and non-participation biases can limit the use of non-probability samples (Baker et al., 2013). To alleviate the impacts of exclusion, selection and bias weighting procedures were implemented prior to data analysis (Baker et al., 2013). More specifically, post-stratification weighting methods were executed (Kalton & Flores-Cervantes, 2003). Demographics were used to balance the results to ensure the

composition of the sample reflected the adult Florida population and to provide results intended to approximate the population of interest.

The survey was also sent to county level decision makers in Florida. A list of email addresses for all county commissioners, county clerks, and county managers ($N = 1,212$) was obtained through an online search. Some counties did not have email addresses readily available and therefore were excluded from participation. The researcher requesting participation in the study sent a link to the survey via email. Three reminders were sent over three weeks with 194 responses received resulting in a response rate of 16%. To account for nonresponse bias, the respondents were compared to the entire population using a series of Chi-square tests based on the sex, political affiliation and geographic location. The results were non-significant based on an alpha level of less than .05 set *a priori* and the sample deemed to be representative of the population of interest. Descriptive statistics and ANOVAs were calculated using the Statistical Package for the Social Sciences (SPSS) to address the research objectives.

To understand attitude and perceptions of agricultural water use, respondents were given the sentence “When it comes to protecting water in Florida, farmers are...” and asked to select where, on a five-point scale between two words, their attitude most closely aligned. This question was conducted in a semantic differential format, with two opposing words displayed from left to right. The word pairings were good/bad, positive/negative, careful/careless, thoughtful/thoughtless, and cautious/reckless, innovative/old-fashioned. A score of one indicated a negative attitude and a five indicated a positive attitude.

To further determine if differences in attitudes towards perceptions of agricultural water use existed between the general public and decision makers a researcher-developed scale was created. The scale requested respondents indicate their level of agreement or disagreement to a variety of questions about farmers and farming practices. Key concepts examined included: trust in water use and protection, use of resources, relationship with the natural environment – positive frame, relationship with the natural environment – negative frame, and impact of agriculture on open space and wildlife. Respondents were asked to indicate their response to each item using a 5-point Likert-type scale. Possible answers included 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Agree nor Disagree*, 4 = *Agree*, 5 = *Strongly Agree*.

An example of the four statements making up the trust in water use and protection concept area was “farmers can be relied upon to keep their promises when it comes to water use.” Responses to the four items were averaged to create the scale and checked for reliability *ex post facto*. The scale was found to be reliable with a Cronbach’s α of .73.

Three statements made up the use of resources concept area. An example of a statement from this concept area was “farmers should use as little fertilizer as absolutely necessary even if it means I have to pay more for the food I purchase.” Responses to the three items were averaged to create the scale and checked for reliability *ex post facto*. The scale was found to be reliable with a Cronbach’s α of .85.

An example of the five statements making up the relationship with the natural environment – positive frame concept area was “farmers conserve water.” Responses to the five items were averaged to create the scale and checked for reliability *ex post facto*. The scale was found to be reliable with a Cronbach’s α of .84.

Five statements made up the relationship with the natural environment – negative frame concept area. An example of a statement from this concept area was “fertilizers used on farms pollute natural water sources.” Responses to the five items were averaged to create the scale and checked for reliability *ex post facto*. The scale was found to be reliable with a Cronbach’s α of .85.

An example of the seven statements making up the relationship with the impact of agriculture on open space and wildlife concept area was “protecting farms is a way to preserve open space.” Responses to the seven items were averaged to create the scale and checked for reliability *ex post facto*. The scale was found to be reliable with a Cronbach’s α of .81.

Finally, respondents were asked about the water topics they were most interested in learning about and their preferred methods for learning about water topics. First, both groups were provided with a list of water-related topics such as restoring fish and aquatic habitats, shoreline cleanup, and irrigation management. They were asked to indicate any of the subject matter areas they were interested in learning more about.

Next, both groups were given a list of learning opportunities they would be interested in engaging in and allowed to select all that applied. The list included getting trained for a regular volunteer position, attending a seminar or conference, attending a fair or festival, taking part in a one-time volunteer activity, attending a short course or workshop, looking at a demonstration or display, reading a newspaper article or series, watching a video, watching TV coverage, or visiting a website.

Results were exported and analyzed using SPSS version 22. Descriptive statistics were calculated to determine the attitude and perception of agriculture water use of the general public and decision makers and ANOVAs were used to examine if differences were statistically significant with an *a priori* alpha level set at .05.

Results

Demographics

Respondents to the general public survey were fairly evenly split in terms of gender, were primarily Caucasian/White (Non-Hispanic) with 17% reporting they were Hispanic (Table 1). Most of the respondents were over 40 years of age and an almost equal proportion of respondents had lived in the state for 0 - 9 years (21.9%), 10 - 19 years (25%), 20 - 29 years (25.3%), and 30 or more years (27.8%).

Respondents to the decision makers survey were also primarily Caucasian/White (Non-Hispanic) but 70% were male. A little over 5% of this group reported being Hispanic. Over 90% of the respondents were between the ages of 40 and 69 and unlike the general public respondents, the majority had lived in Florida for 30 or more years (67.5%).

Table 1

Demographics

	General Public		Decision Makers	
	<i>n</i>	%	<i>n</i>	%
<i>Sex</i>				
Female	271	51.6	28	29.8
Male	254	48.4	66	70.2
<i>Race</i>				
African American	83	15.8	5	5.4
Asian	34	6.5	0	0
Caucasian/White (Non-Hispanic)	397	75.6	83	89.2
Native American	0	0	3	3.2
Other	11	2.1	2	2.2
<i>Hispanic Ethnicity</i>	89	17.0	5	5.4

<i>Age</i>				
18 - 29	112	21.5	1	.60
30-39	89	17.0	10	6.0
40-49	81	15.5	32	19.3
50-59	107	20.5	48	28.9
60-69	95	18.2	49	29.5
70-79	31	5.9	23	13.9
80 and older	7	1.3	3	1.8
<i>Years Living in Florida</i>				
0-9	115	21.9	11	6.5
10-19	131	25.0	22	13.0
20-29	133	25.3	22	13.0
30 and above	146	27.8	114	67.5

Note. Percentages have been rounded and may not total to 100.

Attitude towards and perceptions of agricultural water use

On average, the general public had a more positive perception of agricultural water use than the decision makers (Table 2). When looking at attitude, the general public indicated a positive attitude while decision makers indicated a neutral attitude with the difference between them being larger than a standard deviation. Both the general public and decision makers agreed agriculture uses water resources appropriately and that agriculture has a positive impact on open space and wildlife.

Table 2
Attitudes towards and perceptions of agricultural water use

	General Public <i>M (SD)</i>	Decision Makers <i>M (SD)</i>	Mean Difference
Attitude towards agricultural water use	4.28 (.83)	3.30 (.91)	.98
Trust in agricultural water use and protection	3.69 (.66)	3.20 (.74)	.49
Agriculture's relationship with the natural environment – positive frame	3.80 (.67)	3.37 (.71)	.43
Agricultural use of resources	3.82 (.89)	3.75 (.95)	.07
Impact of agriculture on open space and wildlife	3.75 (.64)	3.71 (.58)	.04
Agriculture's relationship with the natural environment – negative frame	3.50 (.76)	3.56 (.75)	-.06

Differences in attitude towards and perceptions of agricultural water use

A series of ANOVAs were run to determine if statistically significant differences existed between the general public and decision makers (Table 3). There were significant differences in their attitudes, with the general public having a stronger positive attitude than decision makers about agricultural water use. There were also significant differences in trust in the agricultural industry when it comes to water use and protection, with the public exhibiting a higher level of agreement than the decision makers. Lastly, the general public also had significantly higher levels of agreement with statements indicating agriculture has a positive relationship with the natural environment.

Table 3

ANOVA examining differences between the general public and decision makers

	<i>df</i>	<i>F</i>	<i>p</i>
Attitude towards agricultural water use	1	164.59	.00**
Trust in agricultural water use and protection	1	69.58	.00**
Agriculture's relationship with the natural environment – positive frame	1	54.76	.00**
Agricultural use of resources	1	.81	.37
Impact of agriculture on open space and wildlife	1	.51	.47
Agriculture's relationship with the natural environment – negative frame	1	.65	.42

Note. ** $p < .01$.

Learning preferences

Respondents were asked what water subjects they would be most interested in learning more about. Results can be seen in Table 4. In both surveys they were able to select all that apply. Overall, the general public showed more interest in learning about water issues than the decision makers. The general public was most interested in fertilizer and pesticide management, fish and wildlife water needs, shoreline cleanup, and home and garden landscaping ideas for Florida yards. The decision makers were most interested in community actions concerning water issues and home and garden landscaping ideas for Florida yards.

Table 4

Preferred water subject matter areas

	General Public (<i>N</i> = 524) %	Decision Makers (<i>N</i> = 194) %
Fertilizer and pesticide management	39.0	17.5
Fish and wildlife water needs	36.2	13.4
Shoreline cleanup	34.9	17.5
Home and garden landscaping ideas for Florida yards	33.2	21.1
Restoring fish and aquatic habitat	31.3	17.5
Watershed restoration	28.4	14.9
Community actions concerning water issues	28.3	23.2
Irrigation management	25.7	13.9
Septic system management	20.9	18.6
Forest management	20.1	2.6
Private well protection	16.9	11.3
Landscape buffers	16.4	13.9

A summary of how respondents would like to learn about water issues is displayed in Table 5. Overall, the general public would like to learn through visiting a website (75%), watching TV coverage (51%), or watching a video (36%). Decision makers would like to learn through visiting a website (34%), reading a newspaper article or series (23%), attending a short course or workshop (19%) or attending a seminar or conference (19%).

Table 5

Preferred modes of learning

	General Public (N = 524) %	Decision Makers (N = 194) %
Visit a Website	75.7	34.0
Watch TV coverage	50.6	13.9
Watch a video	36.2	14.4
Read a newspaper article or series	33.6	23.2
Look at a demonstration or display	19.7	14.4
Attend a short course or workshop	14.3	19.1
Take part in a one-time volunteer activity	13.9	11.3
Attend a fair or festival	12.0	10.3
Attend a seminar or conference	9.8	18.6
Get trained for a regular volunteer position	7.6	2.1

Conclusions, Implications and Recommendations

The results of this study identified differences in perceptions of agricultural water use between decision makers and the general public exist. Prior to providing recommendations based on the results, it is important to recognize the limitations of this research. First, the study was limited due to the relatively small number of decision maker participants. Statistical tests were performed to determine whether the decision maker respondents were typical of the larger population, and they were found to be so, but only in select demographic characteristics. A second potential limitation was the use of a non-probability sample. While weighting techniques were applied to alleviate concern, the relationship between the sample and the population was unknown. Therefore, it is unclear how representative the sample was of the population as a whole.

The limitations being acknowledged, there are implications emerging from the data that can inform agricultural education and communication practice. According to knowledge gap theory, groups tend to coalesce according to identifiable antecedent conditions. Within this particular research it was expected that the public might have differing views of agricultural water use relative to decision makers surveyed within the same state based on the role condition of the two groups. Specifically, based on decision makers expected increase in media consumption relative to the general public, decision makers should have a different view of agricultural water use than the general public. Accordingly it was hypothesized that the tone and tenor of media may serve as a benchmark for the directionality of the difference between the two groups (Kingdon, 2003). The findings from this study confirmed that decision makers had a significantly lower attitude towards agricultural water use than the general public. Although beyond the scope of this particular research, anecdotal examples of negative perceptions of agricultural water use in the media are readily available (e.g. Kim, Schleuss & Krishnakumar, 2015; Kobylt, 2015) whereas positive media examples are less common (Young & Dhanda, 2013). The exposure to more media, and the nature of the news within the media surrounding agricultural water use, may serve as a likely condition for the differences being observed between these two groups.

Future research should further explore the nature of the relationships between media consumption, tone of media stories, and outcomes within an audience. For example, a longitudinal study could examine a stated belief about agricultural water use at time zero, be followed by the consumption of media (including media source and tone), and then a restatement of belief measured at a future point in time to determine if the media had an impact. Recent research examining priming and emotional contagion within a large social network has demonstrated the efficacy of message salience and persistence (Kramer, Guillory, & Hancock, 2014). A more

comprehensive understanding of how media influences perceptions and attitudes of agricultural water use would benefit agricultural educators and communicators and may further illuminate best practices and approaches.

According to Young and Dhanda (2013), water concerns must be understood by both the general public and decision makers to avoid future water conflicts. The results of this study indicated that decision makers might be representing views and subsequently supporting policies that their constituents do not back. A more proactive messaging approach on behalf of the agricultural industry may assist in bridging the gap between these two groups. It is recommended that agricultural educators and communicators use interventions to improve both groups understanding of agricultural water use (Hahn, Greene, & Waterman, 1994), how the use of best management practices protect natural resources, and to encourage and empower the general public to express their perspectives with decision makers proactively (Anderson, 2011).

The results of this study may also be used to inform the operational and tactical educational content areas and delivery channels most effective for informing and empowering the general public and decision makers. For example, to inform both groups on current agriculture water use a website was identified as the preferred educational channel. However, there were different content preferences identified between the two groups. In particular, the general public had the highest interest in fertilizer and pesticide management whereas decision makers were most interested in community actions concerning water issues. A recommendation for practice would be to establish a common website advertised and available to both groups; however, the content for the website should be very specific within discrete categories. Within the environment a high degree of inter-topic fidelity and navigability should be purposively built to allow the user to begin on one topic of interest and then naturally move to other topics within different areas of interest. The stickiness of the website should naturally lend itself to knowledge exposure and improved understanding across a wider variety of agricultural water topics (Lin, 2007).

A further recommendation would be to develop educational workshops bringing members of the public and decision makers together to discuss water issues. These workshops could be facilitated by extension professionals in their communities and would provide an opportunity and forum for perspectives and beliefs to be discussed within a fact-based environment. Creating a common environment would allow for more effective communication where perceptions might be challenged through credible sources mitigating the potential knowledge and perception gap between the two groups (Hahn et al., 1994).

Lastly, future research is suggested to replicate this study within different states or with a larger decision maker sample. A more robust set of empirical studies may help to further illuminate the differences between decision makers and the general public regarding key agricultural issues such as water. Nevertheless, the results of this study should serve as a benchmark and starting point to help identify similarities and differences between the general public and decision makers, providing agricultural educators and communicators with important insights to resolve issues through improved education, communication and messaging designed for both groups (Doerfert, 2011).

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Using Critical Thinking Styles to Inform Landscape Water Conservation Extension Programs

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Abstract

In the past several years Cooperative Extension has focused on developing educational programs that address water conservation, specifically for individuals using an exorbitant amounts of water, with limited success. However, few research studies have examined how the way people think, including their critical thinking styles, can be used to inform extension program development. The purpose of this study was to address this gap in the literature by examining how people who use a lot of water think critically and whether their critical thinking style influenced their engagement in water conservation (or lack thereof). Responses were obtained from 932 Florida residents identified as high water users in via an online survey. The findings revealed respondents engaged in a low level of landscape water conservation behaviors. The results also showed relationships did exist between critical thinking style and level of engagement in landscape water conservation behaviors implying critical thinking styles should be considered when developing extension programs in this area. Recommendations include using critical thinking style to tailor programs that bring educational awareness of landscape water conservation to high water users.

Introduction

Cooperative Extension has focused on developing educational programs that address major water issues over the past several years (Terlizzi, 2006; Welch & Braunworth, 2010) in order to alert citizens about the dangers of future water shortages. Current water supplies are being depleted at a rapid rate, and the world population continues to increase and, along with it, water consumption needs (Delorme, Hagan, & Stout, 2010; Lamm, Lamm, & Carter, 2015; Vörösmarty, Green, Salisbury, & Lammers, 2000). The water needs of the world will not be met if we continue to consume water at the rate we are currently. In the United States alone the average household consumes approximately 32 gallons of water per day (United States Environmental Protection Agency, 2013), and that rate is increasing. For example, in 2030 Florida's demand for fresh water is expected to increase by 28% when compared to the state's water demand in 2005 (United States Environmental Protection Agency, 2013). If widespread water conservation action is not taken, water shortages will impact future residential water use (Olmstead & Stavins, 2009).

Obtaining information about the way the public engages in water conservation can be useful to extension educators as they strive to encourage behavior change (Lamm et al., 2015; Suero & Rosenberg, 2010). Research has shown when people gain more knowledge they will develop more positive attitudes ultimately adopting new practices that fit in with their current schema (Abu-Taleb & Murad, 1999). Therefore, as the public gains information about future water shortages there is a better likelihood they will take action to conserve water (Jorgensen, Graymore & O'Toole, 2009; Leal, Rumble, & Lamm, 2015). Engagement in water conservation practices includes the adoption of water saving technologies such as low-flow faucets, showerheads, and dishwashers that assist in eliminating water waste (Suero & Rosenberg, 2010) as well as engaging in proper water use in their home landscapes.

Targeting extension programming focused on changing water consumption behaviors to groups of individuals that consume an unusually large amount of water, when compared to the general public, could offer the largest return on investment (Huang & Lamm, in press; Monaghan, Warner, Telg & Irani, 2014). A specific group of water users, labeled as high water users in the literature, consumes more than the average citizen due to their landscaping needs and preferences (Huang, Lamm, & Dukes, in press). Recognizing this is a high impact

audience, extension educators have targeted this population by examining current water usage data available from local utility companies and collected needs assessment data (Monaghan et al., 2014). Research on attitudes, demographics, lifestyles, and current behaviors have also been used to identify this audience needs with some success (Leal et al., 2015; Monaghan, Ott, Wilbur, Gouldthorpe, & Racevkiš, 2013). When addressing water conservation specifically, research has shown extension educators need to understand that certain groups of water users have different attitudes towards conservation and, therefore, have different educational needs (Ott, Monaghan, Israel, Gouldthorpe, & Wilbur, 2015). In addition, research has shown that some audiences adopt behaviors more easily than others (Loibl, Diekmann, & Batte, 2010). This may be due to individual cognitive traits, such as critical thinking styles (Gorham, Lamm, & Rumble, 2014).

Even though critical thinking styles are known to impact how individuals process information (Lamm, 2015a) and deal with critical issues (Lamm, 2015b), very little research has examined how critical thinking styles can be used to inform extension program development. Critical thinking style “explains how an individual prefers one particular method to another when processing information, or critically thinking about a particular topic” (Gorham et al., 2014, p. 44). Critical thinking styles can vary between engagement and seeking information tendencies and provide guidance on how people approach and process information (Lamm, 2015b). During the initial planning stages for new programs, extension educators should align with their client’s needs (Owens, Warner, Rumble, Lamm, Martin, & Cantrell, 2015). As such, having knowledge of their client’s critical thinking styles may assist in the development of experiences that will appeal to a specific audience. This research directly aligns with the American Association for Agricultural Education National Research’s Priority Area one which discusses the importance of enhancing “public and policymaker understanding of agriculture and natural resources” (Doerfert, 2011 p.8) because it seeks to identify best methods for delivering landscape water conservation extension programs to an important segment of the public that is overusing one of the world’s most valuable resources, water.

Conceptual Framework

The conceptual framework for this study was based on the concept of critical thinking style identified by Lamm and Irani (2011). According to Facione (1990), critical thinking is defined as “. . . purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as an explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based” (p. 2). Facione (1990) mentioned critical thinkers are “. . . well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, [and] diligent in seeking relevant information . . .” (p. 2). Lamm and Irani (2011) suggested each critical thinker has an individual style of thinking about a topic that resonates with each specific issue, such as the need to conserve water.

Critical thinking style is a preference for a certain process a thinker goes through when reaching a solution to a problem (Lamm, 2015). Critical thinking style also represents the formalized way an individual converses through their thought process and ultimately reaches a final decision (Irani, 2006). Lamm and Irani (2011) indicated there is not a correct or incorrect way to reason critically but rather introduced the idea that people process information differently and, therefore go through the critical thinking process in a variety of ways. According to Lamm and Irani (2011), an individual’s critical thinking style can be placed on a continuum between engagement and seeking information.

Individuals with a seeking information style or *seekers* are interested in seeking out large amounts of information and are concerned with knowing there was enough time to actively consider all possibilities (Lamm & Irani, 2011). Seekers are hungry learners, eager to process and consume a large amount of information. They also recognize that most situations or problems are multifaceted, and no straightforward answer is likely to be

found when trying to solve problems (Lamm & Irani, 2011). In a study examining Florida residents' water conservation practices in general, Gorham et al. (2014) found seekers preferred to gain information about water conservation by searching through media sources themselves.

Individuals with an engagement critical thinking style or *engagers* are highly engaged with their surroundings, and therefore, are likely able to predict problems that will require critical thinking before they happen (Lamm & Irani, 2011). Engagers also look for opportunities to employ their reasoning skills and are assertive when presented with a problem to solve. They prefer to engage with others' in discussions because they appreciate others opinions, but are also confident in discussing their own reasoning process and how they arrived at their solutions (Lamm & Irani, 2011). Research has shown engagers prefer to learn about water conservation through their environment, which involves more traditional face-to-face contact (Gorham et al., 2014).

Critical thinking style can be used to tailor programs to reach individuals' styles with suitable educational experiences that activate their natural tendencies (Gorham et al., 2014). Developing a stronger awareness of the need for water conservation is a purposeful effort that is a constant challenge requiring a strong commitment (Sindik & Araya, 2013). Understanding how high water users think critically and how their critical thinking styles relate to their engagement in water conservation practices could inform the development of extension programs that are more effective because such are targeted to the population of interest.

Purpose and Objectives

The purpose of this study was to determine how critical thinking style related to engagement in water conservation practices to offer insight into how extension educators can develop extension programs targeted at specific critical thinking styles. The following research objectives guided the study:

1. Describe respondents' level of engagement in landscape water conservation behaviors;
2. Describe respondents' critical thinking styles; and
3. Identify the relationship between respondents' levels of engagement in landscape water conservation behaviors and their critical thinking styles.

Methods

An online questionnaire was administered to Florida residents to identify the relationship between critical thinking style and levels of engagement in landscape water conservation behaviors. The population of interest was high water users in Florida. High water users in Florida were chosen because water is among Florida's most cherished resources and increases in the population are putting an ever-increasing amount of pressure on a somewhat limited water supply (Barnett, 2007; Marella, 2008).

A panel of experts with a background in water conservation, public opinion research, and survey design was used to review the entire instrument for face and content validity. These individuals were selected based on their content and survey construction knowledge. The panel of experts included the director of the UF/IFAS Center for Landscape Conservation and Ecology, the director of the UF Water Institute, the director of the UF/IFAS Center for Public Issues Education and a professor with a specialty in questionnaire design.

Respondents were presented with a 132 item, online instrument; however, only two sets of questions were germane to this study. The first set of questions were adapted from Patterson's (2012) RBC Canadian Water Attitudes Study to measure respondents' level of engagement in landscape water conservation behaviors. Respondents were offered seven items to choose from that referenced landscape water conservation behaviors. Respondents were then asked to use a scale to select from two options either *yes I engage* or *no I do not engage* in this landscape water conservation behavior. If a respondent indicated they did engage in a practice, they were

given a point. The total number of points were summed to create an overall behavior score, that could have ranged from zero to seven, used in further data analysis.

The second set of questions consisted of the University of Florida Critical Thinking Inventory or UFCTI (Lamm & Irani, 2011). The UFCTI identifies how an individual prefers to gather information about a topic by providing a score that distinguishes between individuals with a seeking information critical thinking style (seekers) and those with an engagement critical thinking style (engagers). The UFCTI consists of 20 items requesting respondents indicate their level of agreement or disagreement with each statement on a five-point Likert-type scale ranging from 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Agree nor Disagree*, 4 = *Agree*, 5 = *Strongly Agree*. Thirteen of the items are designated as seeking type questions and seven as engager questions. The responses to the 13 seeker items were summed to create a seeker score. The responses to the seven engager items were summed to create an engager score. To create the overall UFCTI score, the responses to the engager items were reverse coded, summed, and multiplied by 1.866. The overall seeker and reverse coded engager score were then calculated to create an overall UFCTI score. Respondents with a score of 79 or higher were identified as seekers and those with a 78.99 or lower were identified as engagers (Lamm & Irani, 2011). In addition, reliability was summed a priori with the overall UFCTI being achieved a Cronbach's α of .95, for the engager construct, a Cronbach's α of .89, while the seeker construct a Cronbach's of .92. Finally, participants were asked to identify their sex, race, ethnicity, age, residential zip code, and political affiliation.

A non-probability opt-in sampling technique was used to obtain the eligible participants. Non-probability sampling methods strive to represent the population of interest, in this case, high water users, therefore, participation rates were used rather than response rates (Baker et al., 2013). A total of 3,494 Florida residents were asked to participate in the study. However, a resident only qualified as a high water user and allowed to complete the survey if they met certain criteria that included being 18 years of age or older, living in specific counties identified as using high amounts of water in the state of Florida, having an annual household income greater than \$50,000, having an irrigated landscape and hiring an outside company to maintain that landscape (Davis & Dukes, 2014). Participants were gradually invited to participate in the study until specific quotas were filled (Baker et al., 2013). A participation rate of 26.7% ($N = 932$) was obtained based on those who qualified and completed the survey. Quotas were set *a priori* to recognize targeted respondents, therefore, the data was not weighted.

The data were analyzed with descriptive and correlational statistics with Statistical Package for the Social Sciences® 21.0. A significance level of $p \leq .05$ was established *a priori*. To examine the shared characteristics between respondents' levels of engagement in water conservation behaviors and critical thinking style scores, a relationship coefficient (r) was used (Kotrlík, Williams, & Jaber, 2011). It was also used to measure the effect size between the two parameters. The coefficients were interpreted using Davis' (1971) correlational strengths with .01 to .09 indicating a negligible relationship, a .10 to .29 indicating a low level relationship, a .30 to .49 indicating a moderate relationship, a .50 to .69 indicating a substantial relationship, and a score greater than .70 indicating a very strong relationship.

Results

Demographics

Detailed demographics of high water user respondents in the state of Florida are displayed in Table 1. Descriptive analysis showed there was a fairly even gender split within the respondents. The majority of respondents were Caucasian/White (Non-Hispanic) followed by Hispanics. More than 65% of the respondents

had at least a four-year college degree and an annual family income of more than \$75,000 a year. Although all political affiliations were represented, the largest group indicated they were Republican (37.1%).

Table 1

Demographics (N = 932)

	<i>n</i>	<i>%</i>
Sex		
Female	484	51.9
Male	448	48.1
Race		
African American	41	4.4
Asian	14	1.5
Caucasian/White	871	93.5
Hispanic Ethnicity	63	6.8
Native American	5	.5
Age		
18 - 29	21	2.3
30 - 39	92	9.9
40 - 49	108	11.6
50 - 59	188	20.2
60 - 69	313	33.6
70 - 79	188	20.2
80 years and older	22	2.4
Education		
Did not obtain a high school diploma	1	.1
High school diploma	55	5.9
Some college education	153	16.4
2 year college degree	94	10.1
4 year college degree	355	38.1
Graduate degree	274	29.4
Annual Household Income		
\$50,000 to \$74,999	244	26.2
\$75,000 to \$149,999	461	49.5
\$150,000 to \$249,999	167	17.9
\$250,000 or more	60	6.4
Political Affiliation		
Democrat	281	30.2
Republican	346	37.1
Independent	211	22.6
Non Affiliated	84	9.0
Other	10	1.1

Level of Engagement in Landscape Water Conservation Behaviors

Respondents were asked to indicate the landscape water conservation behaviors they engaged in by marking whether or not they engaged in seven behaviors (see Table 2). The behavior in which respondents reported being most engaged in the most was installing a smart irrigation controller ($f = 428, 51.9\%$). Respondents also

indicated they used low water consuming plant materials in their yards to help conserve water ($f = 395, 51.2\%$). In addition, almost half of the respondents had installed high efficiency sprinklers.

Table 2

Landscape Water Conservation Behavior Engagement (N = 932)

Behaviors	f	%
I use a smart irrigation controller	428	51.9
I have low-water consuming plant materials in my yard	395	51.2
I use high efficiency sprinklers	361	48.5
I used recycled wastewater to irrigate my lawn landscape	210	22.5
I have retrofitted a portion of my landscape so that it is not irrigated	162	18.6
I use drip micro irrigation	109	13.2
I used rain barrels to collect water for use in my garden/lawn	72	7.8

For each landscape water conservation item a respondent reported engaging in they were assigned a point. The points were then summed to create an overall score. The total landscape water conservation scores could have ranged from zero to seven. Upon analysis, the mean landscape water conservation behavior engagement score was a 2.15 ($SD = 1.51$) indicating a low overall level of engagement in landscape water conservation behaviors.

Critical Thinking Styles

Critical thinking styles were examined by using the UFCTI. On the UFCTI a respondent can score between a 26 and a 130 with a score of 79 or above designating a respondent as a seeker and a score of 78.99 or lower designating a respondent as an engager. The overall critical thinking style scores of the respondents ranged from 65.17 to 103.67 with a mean score of 77.79 ($SD = 3.87$) indicating the respondents tended toward being engagers (see Table 3).

Table 3

Respondents' Critical Thinking Styles (N = 932)

	M	SD
Overall UFCTI Score	77.79	3.87
Seeker Score	52.60	5.92
Engager Score	28.26	3.57

Relationships between Engagement in Landscape Water Conservation Behaviors and Critical Thinking Styles

Respondents' levels of engagement in landscape water conservation behaviors and their overall critical thinking style scores were analyzed using correlations to determine if relationships existed (see Table 4). Davis' (1971) description of correlational strengths was used to identify magnitude. UFCTI score was found to be negatively correlated with the respondents' level of engagement in landscape water conservation behaviors ($r = -.08, p = .02$). Therefore, the lower the UFCTI score (the less likely to seek information when thinking critically), the less likely the individual was to engage in landscape water conservation behaviors. While this relationship was significant, it was also negligible in terms of strength.

Relationships between seeking information and engagement scores with landscape water conservation behaviors were also examined. The seeking information score had a positive significant relationship with

engagement in landscape water conservation behaviors ($r = .15, p < 0.01$). This result indicated that, while a low association, the more someone has a preference for seeking information when thinking critically the more likely they are to engage in landscape water conservation behaviors. The engager score had a significant negative correlation ($r = -.18, p = .00$) with the level of engagement in landscape water conservation behaviors. This result revealed the more a respondent indicated they engaged when thinking critically, the lower the respondents' engagement in landscape water conservation behaviors. Again, this is a low association by Davis's (1971) convention, but is statistically significant.

Table 4

Relationship between Landscape Water Conservation Score and Critical Thinking Style

	r	p	Strength of relationship
Overall UFCTI Score	-.08	.02*	Negligible
Seeker	.15	.00**	Low
Engager	-.18	.00**	Low

Note. * $p < .05$; ** $p < .01$.

Conclusions, Implications, and Recommendations

The findings from the study revealed respondents classified as high water users in Florida engaged in a low level of landscape water conservation behaviors. These results align with similar findings from both Monaghan et al. (2013) and Huang et al. (in press), further supporting high water users should be a target audience for extension. Although the lack of engagement reiterates there is an opportunity for extension educators to engage residents that use a high amount of water in the landscape it also implies there are barriers to engagement since the work done in this area (Monaghan et al., 2014) does not seem to be having the desired effect.

Interestingly enough, the findings from this study do confirm what Jorgensen et al. (2009) found, indicating that residents will take some level of responsibility towards their action pertaining to the amount of water they consume. This was evident by the respondents reporting the use of low water-consuming plant materials in their yards, and using smart irrigation controllers for their landscapes. It is important to note that “Florida is one of just a few states with a rain sensor statute” (Dukes & Haman, 2013 p. 1). This statute may have impacted the number of homes with smart irrigation controllers, rather than it being a homeowners' choice to purchase the product for water conservation reasons.

In addition to distinguishing the level of engagement of Florida high water users in landscape water conservation behaviors, this study focused on critical thinking styles of the respondents. The overall critical thinking score determined a majority of the respondents were engagers of information. The results also revealed relationships did exist between critical thinking style and levels of engagement in landscape water conservation behaviors. The findings support previous research that identified differences in the way seekers and engagers use their information processing routes to make choices around actual engagement in behaviors (Gorham et al., 2014; Lamm & Irani, 2011). More specifically, the results indicated the higher the respondents' seeker score (an increased tendency to seek information when thinking critically) the more likely the individual was to engage in landscape water conservation behaviors. The results also indicated the more a respondent showed they engaged with others when thinking critically, the lower the respondents' level of engagement in landscape water conservation behaviors. While it is important to recognize the effect sizes were low, Steinberg (2011) points out that low associations can assist in exploring relationships.

The findings from this study showed that as extension educators continue to educate stakeholders about the importance of landscape water conservation it is important to understand critical thinking styles as a tool for enhancing program planning (Huang & Lamm, in press). More specifically, extension educators should use critical thinking style to tailor programs that bring educational awareness about landscape water conservation behaviors to high water users. Since the majority of high water users are engagers, and are less likely than their seeker counterparts to engage in water conservation behaviors, extension educators should think about how engagers consume information when developing their programs. Engagers obtain information by engaging in conversations (Lamm & Irani, 2011). This implies high water users are most likely conversing with other high water users (potentially their neighbors and friends) that are reinforcing their negative behaviors through social norms. To counteract this behavior, extension educators should get groups of neighbors and friends together to discuss the value of engaging in landscape water conservation efforts so they can proactively encourage one another and hold each other accountable. In addition, extension educators could provide programming within a neighborhood by collaborating with the homeowner's association or being present at a local clubhouse rather than their county extension office so the program is being delivered within the established social system and may attract more high water users. Extension programs targeting engagers should include face-to-face interactions and group discussions to emphasize the social side of information gathering and decision-making (Gorham et al., 2014).

Although not the majority, a large group of high water users were also seekers. To reach this audience extension educators should create more distance learning materials with tutorials, interactive blogs, and fact sheets. These materials would allow seekers the ability to find the information they need to make personal decisions regarding their landscapes, and the use of water (Lamm & Irani, 2011).

Considering the low effect size of the relationship, it is important to further explore this area of inquiry. First, it is suggested the study be replicated in other states that have high water users and are dealing with larger water shortages than Florida, such as California. It would also be important to examine the impacts of statewide regulation, such as the rain sensor statute mentioned previously to determine if governmental regulation has more impact than educational initiatives and to determine if extension educators should be partnering with those regulating water use. Lastly, it would be good practice to develop programs with engagers and seekers in mind and then create an experimental design, introducing the different approaches to individuals with both critical thinking styles, to see if behavior changes are more evident in programs directly focused on reaching participants through their critical thinking styles.

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