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2015 Western Region AAAE Researh Conference
Research Paper Review Process

The 2015 Western AAAE Research Conference call for papers was distributed via the AAAE list serve on January 02, 2015. The deadline for submissions was set at June 1, 2015. Twenty-five manuscripts were submitted for review through the FastTrack system. The blind review process resulted in 15 papers accepted for presentation. All authors were notified of acceptance on July 23, 2015. The research sessions were held at the Western Region AAAE conference on Wednesday, September 15, 2015.

The selction process was made possible by the service of David Doerfert, the AAAE Conference Manusctipt Submission and Review Manager. His work providing technical assistance and overseeing the review process using the FastTrack system is greatly apprecieated. A special thank you should be extended to the session chairs and facilitators of the research sessions at the 2015 Western AAAE Research Conference as well as the judges who helped select the outstanding research presentation. Finally, thank you to the authors who graciously shared their research to strengthen our profession.

Acknowledgement:

The Program Improvement Committee appreciates the work of Allison Touchstone, Kuna, Idaho for handling the Call for Abstracts, recruiting reviewers, and assigning abstracts for review. Further, the Committee appreciates the efforts of Mike Spiess, CSU-Chico for his work on the poster submission system set-up and maintenance.

2015 Western Region AAAE Research Paper Manuscript Reviewers

Thank you to the professionals who volunteered their time and expertise in the manuscript review process.

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Year	Location	Chair(s)	University
1982	Austin, TX	Gary E. Briers	Texas A&M University
1983	Rio Rico, AZ	Phillip A. Zubrick	University of Arizona
1984	Oklahoma City, OK	David Cox	Cameron University
		James P. Key	Oklahoma State University
1985	Boise, ID	John W. Slocombe	University of Idaho
1986	Las Cruces, NM	Paul R. Vaughn	New Mexico State University
1987	Logan, UT	Gilbert Long	Utah State University
1988	Ft. Collins, CO	Ramsey Groves	Colorado State University
1989	Sparks, NV	Joseph G. Harper	University of Nevada, Reno
1990	Fresno, CA	James G. Leising	University of California, Davis
1991	Seattle, WA	Marvin D. Kleene	Washington State University
1992	Cody, WY	Carl L. Reynolds	University of Wyoming
1993	Bozeman, MT	Van Shelhamer	Montana State University
1994	Honolulu, HI	David E. Cox	University of Arizona
		Frank C. Walton	University of Hawaii
1995	Phoenix, AZ	Glen M. Miller	University of Arizona
1996	Moscow, ID	Jim Connors	University of Idaho
1997	Stillwater, OK	James White	Oklahoma State University
1998	Salt Lake City, UT	Gary S. Straquadine	Utah State University
1999	Corpus Christi, TX	Lance Keith	Texas Tech University
		Jacqui Lockaby	Texas Tech University
2000	Las Cruces, NM	Brenda Seevers	New Mexico State University
		Robert M. Torres	New Mexico State University
2001	Carmel, CA	William Kellogg	Cal Poly, SLO
		J. Scott Vernon	Cal Poly, SLO
2002	Spokane, WA	Michael K. Swan	Washington State University
2003	Portland, OR	Gregory W. Thompson	Oregon State University
		Brian K. Warnick	Oregon State University
2004	Honolulu, HI	Martin J. Frick	Montana State University
		Michael K. Swan	Washington State University
2005	Prescott, AZ	Billye B. Foster	University of Arizona
		Edward A. Franklin	University of Arizona
2006	Boise, ID	Lori L. Moore	University of Idaho
2007	Cody, WY	Carl L. Reynolds	University of Wyoming
2008	Park City, UT	Rudy S. Tarpley	Utah State University
		Brian K. Warnick	Utah State University
2009	Lake Tahoe, NV	Vernon Luft	University of Nevada, Reno
2010	Great Falls, MT	Shannon K. Arnold	Montana State University
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		Theresa Pesl Murphrey	Texas A&M University
2014	Kona, HI	Scott Burris	Texas Tech University
		Jon Ulmer	Texas Tech University
2015	Corvallis, OR	Misty D. Lambert	Oregon State University
		Jonathan J. Velez	Oregon State University

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Facilitator: Aaron McKim, Oregon State University
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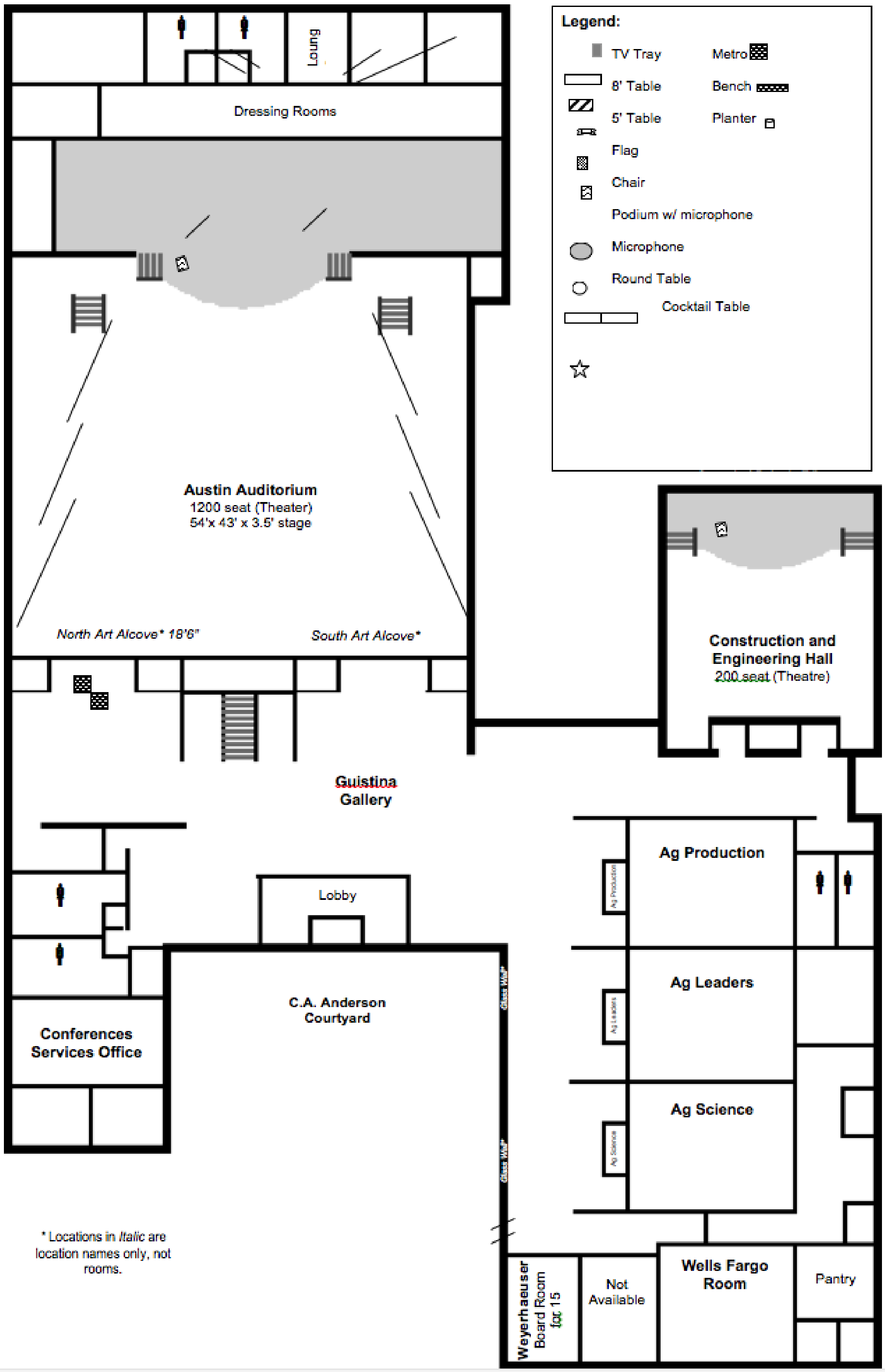
LaSells Stewart Center



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LaSells Stewart Center

Innovative Idea Posters
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Ag Leaders Room
LaSells Stewart Center

Why are Teachers Leaving? Exploring the Influence of Work-Family Conflict on Secondary Agriculture Teachers' Turnover Intentions

Tyson J. Sorensen, Utah State University
Aaron J. McKim, Oregon State University
Jonathan J. Velez, Oregon State University

Abstract

Using data from a random sample of secondary agriculture teachers in the United States, this study explored the work-family conflict and turnover intentions of agriculture teachers. Additionally, this study sought to determine the relationship between work-family conflict and agriculture teachers' turnover intentions. Work-family conflict was split into two domains, work interference with family and family interference with work. Teachers reported the higher level of work-family conflict within the work interference with family domain. However, agriculture teachers in this study identified moderately low turnover intentions. The three variable of interest (i.e. work interference with family, family interference with work, and turnover intentions) were compared by sex with no statistically significant differences found. The final objective of this study was to determine the relationship between the two work-family conflict variables and agriculture teachers' turnover intentions. Using sex as a control variable, the model predicted 18% of agriculture teachers' turnover intentions. Only one of the predictor variables, work interference with family, was identified as a significant predictor of turnover intentions. The implications of work-family conflict, specifically work interference with family, are discussed and recommendations for research and practice are explored.

Introduction and Need for the Study

The shortage of qualified teachers has remained one of the persistent issues facing the American education system over the past few decades (Ingersoll, 2001). Agricultural education has not been immune to this problem, with a shortage of teachers plaguing the profession for more than 40 years (Kantrovich, 2010). Solving this teacher shortage is imperative to providing all students with access to a positive learning environment (Elfers, Plecki, & Knapp, 2006). This study explored data from a national sample of agriculture teachers to shed light on the teacher shortage issue within secondary agricultural education.

Solving the teacher shortage problem requires two major efforts: recruitment of more teachers into the profession and retention of those teachers within the profession. In this study, we focused on the retention of existing agriculture teachers. Ingersoll and Smith (2003) identified teacher retention as a priority to stop the "revolving door" in which teachers flood out of the profession seemingly as quickly as they enter. In an effort to understand teacher retention, research has emphasized relationships between work variables and teacher retention without proportionately attending to variables outside of the workplace. However, evidence suggests home and family variables (e.g. raising children, family relocation) are among the most common reasons why teachers of all disciplines leave the teaching profession (Ingersoll, 2001). These findings illuminate a potential conflict between the expectations of teachers at work and at home.

The potential for conflict between work variables and home variables within agricultural education is exacerbated by the strenuous demands of the agriculture teacher profession. Newcomb, Betts and Cano, (1987) stated agriculture instructors complain about having more work to do than is “humanly possible” (p. 26). Agricultural educators must meet the traditional demands of teaching as well as roles associated with the total program (Torres, Ulmer, & Aschenbrener, 2008). Agricultural educators regularly surpass a standard 40 hour-week doing such things as preparing lessons, completing paperwork, coaching career development teams, evaluating student work, managing labs and equipment, and supervising student projects (Torres et al., 2008).

Research throughout agricultural education supports the notion that agriculture teachers are struggling to meet the demands of the profession. Specifically, research has identified working long hours (Mundt & Connors, 1999; Torres, Lawver, & Lambert, 2009), preparing classes (Boone & Boone, 2007; Mundt & Connors, 1999; Myers, Dyer, & Washburn, 2005), meeting deadlines (Torres et al., 2008; Torres et al., 2009), managing time (Boone & Boone, 2007; Edwards & Briers, 1999; Myers et al., 2005), balancing personal life and professional life (Edwards & Briers; 1999; Mundt & Connors, 1999; Myers et al., 2005; Torres et al., 2009), managing and reducing stress (Edwards & Briers, 1999; Myers et al., 2005), and excessive paperwork (Boone & Boone, 2007; Mundt & Connors, 1999) as major challenges faced by agriculture teachers. As the expectations of agriculture teachers continue to increase, and teachers spend more time at work, less time is available for other life roles, including family. Research is needed to identify the relationship between the potential conflict between work and family roles and agriculture teachers’ turnover intentions. This study sought to address this gap in the literature by utilizing a national sample of agriculture teachers to explore the relationship between time-based work and family conflict and agriculture teachers’ intentions to leave the profession.

Theoretical Framework

The theoretical foundation for this research is the role conflict theory (Greenhaus & Beutell, 1985). The role conflict theory emerged from literature identifying the negative psychological effects of trying to balance work and non-work roles. Greenhaus & Beutell (1985) called this “work-family conflict” (WFC from here on), and defined it as “conflict in which the role pressures from the work and family domains are mutually incompatible in some respect” (Greenhaus & Beutell, 1985, p. 77). This theory assumes an individual’s time and energy are limited (scarcity hypothesis), and resources expended in one role (e.g. work) depletes resources available for other life roles (e.g. family), thereby creating conflict (Gutek, Searle, & Klepa, 1991).

The role conflict theory also assumes the amount of WFC an individual experiences rises proportionally with the number of hours he or she spends engaged with either work or family roles (Duxbury, Higgins, & Lee, 1994; Gutek et al., 1991). Accordingly, the more time an individual spends participating in work-related activities, the more they should experience their work interfering with family activities and obligations. On the other hand, the more time an individual spends in family related activities, the more they should experience family interfering with work. The important interactions between work and family roles create a bi-directional WFC variable. More specifically, conflict can take the form of work interference with family (WIF) or family interference with work (FIW). Research has identified WIF and FIW to be positively related to both turnover intentions and actual attrition (Allen, Herst, Bruck, & Sutton, 2000; Grandey & Cropanzano, 1999; Greenhaus, Collins, Singh, & Parasuraman, 1997; Netemeyer, Boles, & McMurrian, 1996). Figure one illustrates the relationship between WIF, FIW, and turnover intentions.

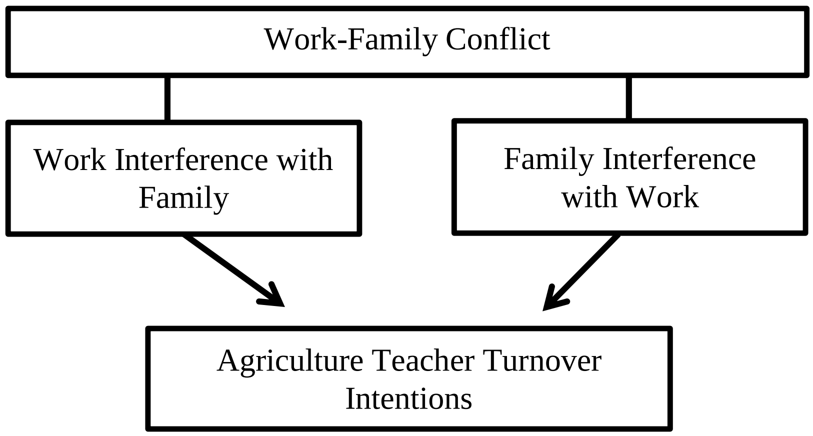

Figure 1. Conceptual model of WIF, FIW, and teacher turnover intentions.

Literature Review

The literature on work-family conflict and teacher turnover is expansive. In this review of literature, we focused on three areas of existing research most salient to our analysis. Those three areas are: the potential influence of changing demographics, research on work-family conflict, and research on teachers' turnover intentions.

Changing Demographics

The importance of WFC among working Americans emerged with changes in demographic patterns across the United States. According to Barnett and Hyde (2001), "One of the most dramatic markers of the late 20th and early 21st centuries is the astonishingly fast pace of change in the work and family roles of women and men in the United States" (p. 781). As earning power among men diminished in the 1970's, many married women entered the labor force to help support their families. Since then, traditional models that depended on the man as the exclusive breadwinner, and the woman concentrating solely on the home, no longer apply to the majority of American families (Bond, Galinsky, & Swanberg, 1998).

In tandem with society's changes, agricultural education experienced significant demographic shifts. When the Smith-Hughes Vocational Education act of 1917 was passed, secondary agricultural education consisted primarily of males. With the Civil Rights movement and the passing of Title IX in 1972, females were given equal access to education programs, including agricultural education. Consequently, female enrollment in agricultural education increased; however, this increase did not immediately translate into more women pursuing careers as agricultural educators. In fact, very few females in the 1970's and 1980's entered the agriculture teaching profession. In 1987, females comprised only 5 percent of agriculture teachers (Knight, 1987). However, by 2001 the proportion of females had risen to 22 percent, and by 2007, females represented roughly 27 percent of agricultural educators (Camp, Broyles, & Skelton, 2002; Kantrovich, 2007).

Due to the competing demands between work and family roles, responsibilities at home often interfere with demands at work, and vice versa, resulting in WFC. Both men and women experience WFC; however, men and women may experience WFC differently. In our study, we sought to control for potential differences between how men and women experience WFC by including sex as a control variable within our analysis of the relationship between WFC and teacher turnover intentions.

Work Family Conflict

Since the industrial revolution, the interface between work and family domains has become a major consideration for employees, families, and society (Westman & Piotrkowski, 1999). In recent decades, changing workforce demographics and shifting gender roles have blurred the lines between work and family roles (Gignac, Kelloway, & Gottlieb, 1996). Many in the workplace, including teachers, bring tasks from their job home with them to be completed while occupying the family role. Additionally, advances in technology have allowed more people to be able to accomplish work while occupying the family domain. The spillover of work and family roles has increased the potential for WFC (Crouter, 1984). Educational research has largely failed to explore this phenomenon and the potential influence on teacher satisfaction and retention (Cinamon & Rich, 2005). In agricultural education, WFC has often been characterized as work-family balance (Crutchfield, Ritz, & Burris, 2013; Murray, Flowers, Croom, & Wilson, 2011). Nonetheless, little research has explored this issue on a national scale. In this study, we sought to explore WFC among secondary agriculture teachers in the United States and the impact of WFC on teachers' turnover intentions.

Teacher Turnover

Understanding why teachers are leaving the profession is critical to stopping the "revolving door" of teacher attrition (Ingersoll & Smith, 2003). Research throughout education has explored the effects of workplace characteristics on teacher turnover. Those variables found to relate to teachers leaving the profession include low salary (Boyd, Lankford, & Wyckoff, 2005; Flynt & Morton, 2009; Krieg, 2006), classroom management (Gonzales, Brown, & Slate, 2008; Ingersoll, 2001), and high student to teacher ratio (Theobald, 1990). In addition to those factors influencing teacher turnover, research has explored workplace factors associated with teacher retention; these variables include mentoring programs (Danielson, 2002; Eller, Deorfler, Meier, 2000; Smith & Ingersoll, 2004), supportive administrators and colleagues (Darling-Hammond, 2000; Eller et al., 2000; Ingersoll, 2001; Smith & Ingersoll, 2004) and teacher autonomy (Ingersoll, 2001; Shen, 1997).

Focusing on agricultural education, research has identified a number of variables influencing teacher attrition, including administrative support (Boone & Boone, 2007; Walker, Garton, and Kitchel, 2004), excessive workload (Chaney, 2007), low salary (Boone & Boone, 2007), student discipline (Boone & Boone, 2007; Mundt & Connors, 1999; McKim & Velez, 2015; Myers et al., 2005), and teacher self-efficacy (Blackburn & Robinson, 2008; McKim & Velez, 2015; Swan, 2005; Wheeler & Knobloch, 2006). Tippens et al. (2013) used this research to build a comprehensive model of teacher attrition in agricultural education (Tippens et al., 2013). This model includes family and personal factors (e.g. children and family responsibilities), financial compensation, employment factors (e.g. teacher experience), and working conditions as the most salient factors influencing agriculture teacher attrition.

The persistent shortage of qualified agriculture teachers (Kantrovich, 2010) necessitates new areas of exploration into teacher retention. To date, research has explored a number of variables influencing teacher attrition; however, there is a dearth of studies exploring the relationship between WFC and attrition. Furthermore, there are no known national studies within agricultural education exploring the relationship between WFC and teacher attrition. This study sought to address this gap in the literature by exploring a national sample of agriculture teachers and the relationship between WFC and turnover intentions.

Purpose & Objectives

The purpose of this study was to describe secondary agriculture teachers' work family conflict (WFC), turnover intentions, and the relationship between WFC and turnover intentions. Exploring WFC and its impact on teacher turnover aligns with the National Research Agenda Priority Area Number Three. Priority area three calls for research exploring the development of a highly qualified agriculture workforce and, recognizing the importance of agricultural educators, stated, "This will require that adequate numbers of well-prepared, highly effective agricultural educators, communicators, and leaders be made available to meet current and future needs" (Doerfert, 2011, p. 20). In order to accomplish our purpose, the following research objectives were developed to guide the study.

1. Describe the sample of agriculture teachers.
2. Describe the work-family conflict (WFC) of agriculture teachers; specifically work interference with family (WIF) and family interference with work (FIW).
3. Describe agriculture teachers' turnover intentions.
4. Determine the relationship between WIF, FIW, and agriculture teachers' turnover intentions.

Methods

The initial population for this study consisted of approximately 11,000 secondary agriculture teachers in the United States during the 2014-2015 school year (National FFA Organization, 2014). The appropriate sample size was determined based on Cochran's (1977) and Krejcie and Morgan's (1970) sample size determinant formulas. This study targeted a simple random sample from the entire population of secondary agriculture teachers in the United States. A sample frame of 778 agriculture teachers was obtained from the National FFA Organization and consisted only of names and email addresses. The instrument was sent to all potential respondents using the tailored design method (Dillman, 2007). Due to our interest in the potential conflict between work and family roles, it was imperative to limit respondents to those who identified as active participants in a family role. This was defined, for participants, as participation in "any and all committed relationships that might influence how time is invested in the non-work domain." In total, 34 participants did not meet the population parameters for the study and a total of 75 participants' emails "bounced." A total of 234 usable surveys were collected out of 667 total potential participants, yielding a response rate of 35.08% (n = 234). The data were downloaded into the Statistical Package for the Social Sciences (SPSS) version 20.0 for analysis.

Non-response bias was assessed using the methods outlined by Lindner, Murphy, and Briers (2001). Due to the limited contact information provided in the frame, no attempt was made to contact non-respondents by telephone. Thus, as recommended by Lindner et al., (2001), on-time respondents (n = 199) were compared with late-respondents (n = 35) to determine if any systematic differences existed. No statistically significant differences existed between on-time and late respondents within the variables of interest. Therefore, we considered non-response error to be insignificant to this study (Lindner et al., 2001; Miller & Smith, 1983).

The survey instrument consisted of questions to assess and explore relationships between WFC and the turnover intentions of agriculture teachers. Time-based work-family conflict (WFC) was measured using the six-item, time-based subscale of the work family conflict scale (WFCS; Carlson Kacmar, & Williams, 2000). This instrument was designed to assess *work interference with family* (WIF) and *family interference with work* (FIW). Participants rated each item on a 6-point scale (from 1 "Strongly Disagree" to 6 "Strongly Agree"), with higher scores indicating greater conflict. Sample items for the WIF construct included "My work keeps me from my family activities more than I would like" and "I have to miss family activities due to the amount of time I must spend on work responsibilities." Sample items for the FIW construct included "The time I spend on family responsibilities often interfere with my work responsibilities" and "The time I spend with my family often causes me not to spend time in activities at work that could be helpful to my career." The WFCS has been used extensively in research and has been found to be reliable and valid (Bruck, Allen, & Spector, 2002; Carlson et al., 2000; Fu & Shaffer, 2001; Ogungbamila, 2014; Vieira, 2013).

Agriculture teachers' turnover intentions were measured using items from the School and Staffing Survey (SASS; NCES, 2014) and the attrition risk assessment instrument (Lemons, 2013). These instruments were synthesized into a four-item construct used to determine agriculture teachers' intent to exit the teaching profession before retirement. Example items included "I plan to leave agriculture teaching sometime before I am eligible to retire" and "If I could get another job different from being an agriculture teacher, I would take it." Participants rated items on a 6-point scale (from 1 "Strongly Disagree" to 6 "Strongly Agree"). Higher scores on the teacher turnover intentions scale indicated more intention to leave the profession early. We choose to use turnover intentions due to the research identifying it as a strong predictor of actual turnover, even more so than job satisfaction and organizational commitment (Kopelman, Rovenpor, & Millsap, 1992; Vandenberg & Nelson, 1999).

A panel of experts consisting of doctoral students in the College of Education and professors in the College of Agriculture examined and critiqued the instrument for content and face validity and overall quality. Construct reliability estimates for each construct were calculated from a pilot test of career and technical education teachers in Oregon (see Table 1). According to Nunnally (1994), reliability estimates should meet or exceed an alpha of .70 to be considered reliable. All of the constructs in this study's instrument exceeded the alpha of .70.

Table 1

Construct Reliability Estimates of the Survey Instrument from Pilot (n = 30)

Instrument Construct	Cronbach's α
Work Interference with Family (WIF)	.92
Family Interference with Work (FIW)	.84
Turnover Intentions	.88

The data, collected through Qualtrics, were downloaded into the Statistical Package for Social Sciences (SPSS) version 20.0 for analysis. Before conducting data analyses, we explored the assumptions of parametric data as well as the specific assumptions of regression analyses. Regarding the assumptions of parametric data, we found the variances to be the same throughout the data, the data to be independent, and the data to be normally distributed. In addition to the assumptions of parametric data, we checked for the assumptions of linear regression, including variable types, non-zero variance, collinearity between independent variables, homoscedasticity, independent and normally distributed error, and linearity between predictor and outcome variables. We found the data met all of the assumptions of regression.

Research objective one (i.e. describe the sample of agriculture teachers) was accomplished by determining and reporting demographic data. In order to accomplish research objectives two (i.e. describe the work-family conflict of agriculture teachers; specifically work interference with family and family interference with work) and research objective three (i.e. describe agriculture teachers' turnover intentions), means and standard deviations were calculated and reported. Data for research objectives two and three were parsed and reported by sex so that male and female agriculture teachers could be compared. Additionally, we performed independent samples *t*-tests to determine if any statistically significant differences existed between male and female respondents regarding WIF, FIW, or turnover intentions. Effect sizes were also calculated for the differences in means using Cohen's *d*. The criteria for effect size was established *a priori* at less than 0.20 "negligible;" between 0.20 and 0.49 "small;" between 0.50 and 0.80 "medium;" and more than 0.80 "large" (Cohen, 1988). In order to accomplish research objective four (i.e. determine the relationship between WIF, FIW, and agriculture teachers' turnover intentions), we ran an ordinary least squares (OLS) regression. The predictor variables included were WIF, FIW, and sex with the dependent variable being teachers' turnover intentions. Betas, standardized betas, and overall R^2 were calculated and reported.

Findings

Demographic information was collected from respondents (n = 234) to accomplish research objective one. Of the responding teachers, 40.08% were female, 59.91% were male. Respondents ranged from 22 to 69 years old with the mean age being 40.26. The majority of responding teachers (93.42%) self-identified as “White, European American, Non-Hispanic.” At the time of data collection, 93.24% of responding teachers were married and 72.22% of respondents indicated they had children. On average, responding teachers had 10.22 years of teaching experience, taught 20.19 students per class, and taught in schools with an average of two agriculture teachers.

The second and third research objectives sought to describe agriculture teachers’ work interference with family (WIF), family interference with work (FIW), and turnover intentions (see Table 2). Overall, agriculture teachers in this study reported moderate levels of WIF (M = 4.58). When comparing WIF by sex, males reported slightly higher WIF (M = 4.63) than females (M = 4.54). However, there were no statistical differences between males and females for WIF (p-value = .545). Furthermore, effect size measurements indicated sex had a negligible effect on teachers’ WIF (Cohen’s d = 0.08). Regarding FIW, agriculture teachers in this study reported moderately low levels of FIW (M = 2.78). When comparing FIW by sex, females reported slightly higher FIW (M = 2.86) than males (M = 2.75). However, there were no statistical differences between males and females for FIW (p-value = .422). Furthermore, effect size measurements indicated sex had a negligible effect on teachers’ FIW (Cohen’s d = 0.10). Teachers’ turnover intentions were assessed to accomplish research objective three. Overall, agriculture teachers in this study reported moderately low intentions to exit the teaching profession prior to retirement (M = 2.95). When comparing agriculture teachers’ turnover intentions by sex, females reported slightly higher turnover intentions (M = 2.98) than males (M = 2.92). However, there were no statistically significant differences between males and females for reported turnover intentions (p-value = .774). Furthermore, effect size measurements indicated sex had a negligible effect on teachers’ turnover intentions (Cohen’s d = 0.04).

Table 2
WIF, FIW, and Turnover Intentions by Sex

	Total (n = 227)		Female (n = 91)[1]		Male (n = 136)[1]				
Constructs	M	SD	M	SD	M	SD	t	p-value	Cohen’s d
Work Interference with Family (WIF)	4.58	1.07	4.54	1.14	4.63	1.01	-0.60	.545	0.08
Family Interference with Work (FIW)	2.78	1.04	2.86	1.06	2.75	1.04	0.81	.422	0.10
Turnover Intentions	2.95	1.35	2.98	1.37	2.92	1.33	0.29	.774	0.04

Note. WIF, FIW, and turnover intentions were measured on a six point scale from 1 “Strongly Disagree” to 6 “Strongly Agree.”
[1]Seven teachers declined to respond.

The fourth research objective sought to determine the relationship between WIF, FIW, and agriculture teachers' turnover intentions. An OLS regression was conducted to determine this relationship. The dependent variable was agriculture teachers' turnover intentions while the independent variables were WIF and FIW. Additionally, sex was entered into the regression as a control variable. The independent variables, in combination, comprised a significant model (F = 15.68; p-value < .001) and predicted 18% (R^2 = .18) of the variance in agriculture teachers' turnover intentions (see Table 3). Only one predictor variable, WIF, was a significant predictor of teachers' turnover intentions (β = .41; p-value = < .001). Sex and FIW were insignificant predictors in this model.

Table 3

Relationship between WIF, FIW, and Turnover Intentions

	Dependent Variable: Teacher Turnover Intentions					
Variable	Zero-order correlation (r)	p-value	B	SEB	β	p-value
Sex	.02	.774	-.10	.17	-.04	.538
WIF	.42	<.001	.53	.08	.41	<.001
FIW	.08	.258	.04	.08	.03	.638

Note. R = .42, R^2 = .18, F = 15.68, p-value < .001. WIF, FIW, and turnover intentions were measured on a six point scale from 1 "Strongly Disagree" to 6 "Strongly Agree."

Conclusions, Implications, and Recommendations

The purpose of this research was to provide the first nationwide analysis of secondary agriculture teachers' work-family conflict (WFC), measured as work interference with family (WIF) and family interference with work (FIW), turnover intentions, and the relationship between WFC variables and agriculture teachers' turnover intentions. We felt this analysis was a critical step in understanding agriculture teacher retention. The first research objective provided insight into the responding teachers' demographics. Considering the random sampling methodology utilized in this study, this information provides valuable insight into the demographics of secondary agriculture teachers who identified themselves as active participants in a family role.

Research objective two sought to describe agriculture teachers' WFC. This construct was split into two areas, WIF and FIW, to provide additional insight into the origination and type of WFC experienced by secondary agriculture teachers. Consistent with research outside agricultural education (Cinamon & Rich, 2005), our findings revealed agriculture teachers experienced higher levels of WIF than FIW. This finding suggests agriculture teachers experience more conflict originating in the work domain than the family domain. In other words, the negative psychological strain that agriculture teachers experience as a result of negotiating multiple life roles is a result of workplace characteristics more than of family characteristics. The expansive work responsibilities of agriculture teachers (Boone & Boone, 2007; Mundt & Connors, 1999; Myers et al., 2005; Torres et al., 2009) are likely causing the work domain to spill into teachers' family lives, causing strain or conflict. This finding highlights the need to increase agriculture teacher competence in time management within the workplace and/or seek methods for reducing the workplace expectations of agriculture teachers. Acknowledging the challenges of implementing these recommendations, we suggest qualitative research should guide action. Specifically, we feel qualitative research exploring the motivating factors behind agriculture teachers investing additional time doing work related activities, barriers to agriculture teachers reducing the demands of the workplace domain, and the time management practices being employed by agriculture teachers can shed additional light on this issue. This information can serve as a platform to develop policies and procedures that eliminate barriers to agriculture teachers balancing work and family roles, optimize the time management practices of agriculture teachers, and address the motivational factors of agriculture teachers without placing additional time requirements on teachers.

The WFC variables, WIF and FIW, were also compared between male and female agriculture teachers. Traditional gender expectations suggest women should experience more WFC than men because they traditionally take on greater responsibility with rearing children than men (Byron, 2005; Higgins, Duxbury, & Lee, 1994; Pleck, 1977). However, our research found no statistically significant differences between male and female agriculture teachers for FIW and WIF. Research in agricultural education has targeted the specific challenges of female agriculture teachers with findings illuminating WFC challenges among female teachers (Baxter Stephens, & Thayer-Bacon, 2011; Foster, 2001; Kelsey 2006; Murray et al., 2011). However, our findings suggest the scope of research exploring specific WFC challenges of agriculture teachers should include both male and female agriculture teachers.

Research objective three sought to describe agriculture teachers' turnover intentions. The construct used to measure turnover intentions was specifically designed to identify teachers' intentions to leave the profession prior to retirement. On average, respondents "somewhat disagreed" with statements indicating they intended to leave agriculture teaching before retirement. This is consistent with research in agricultural education identifying high career commitment and job satisfaction among practicing agriculture teachers (Cano & Miller, 1992; Castillo, Conklin, & Cano, 1999; Chaney, 2007; Chenevey, Ewing, & Whittington, 2008; Crutchfield et al., 2013; Grady & Burnett, 1985; Kitchel et al., 2012; McKim & Velez, 2015; Ritz, Burris, & Brashears, 2013; Sorensen & McKim, 2014; Walker et al., 2004). In addition to identifying low turnover intentions, our study identified male and female agriculture teachers have statistically similar intentions to remain in the profession. This finding supports previous research in agricultural education indicating sex does not influence teachers' commitment to stay in the profession (Cano & Miller, 1992; Sorensen & McKim, 2014). Additionally, these findings suggest the "revolving door" or teaching turnover is not specific to one gender; therefore, efforts to address teacher commitment to the agriculture teacher profession should include *both* male and female teachers. Furthermore, these findings support the need for longitudinal research addressing potential mediating variables between agriculture teachers' intention to remain in the teaching profession and actual retention.

The final research objective sought to determine the relationship between agriculture teachers' WIF, FIW, and turnover intentions. In our model of turnover intentions, only one of the independent variables, WIF, was a statistically significant predictor. This finding suggests as agriculture teachers experience higher levels of work interfering with family, their intention to leave the profession increases. This finding supports research outside of education linking WFC, turnover intentions, and teacher turnover (Allen et al., 2000; Grandey & Cropanzano, 1999; Greenhaus et al., 1997; Netemeyer et al., 1996). Furthermore, this finding aligns with research in agricultural education identifying a relationship between teachers' ability to balance work and family and their career commitment (Chaney, 2007; Crutchfield et al., 2013; Sorensen & McKim, 2014).

The relationship between WIF and turnover intentions is particularly concerning considering agriculture teachers' WIF was the higher of the two WFC domains. However, agriculture teachers still perceived low levels of turnover intentions. We suggest this finding may illuminate a tenuous balance for agriculture teachers in which they experience WIF while simultaneously experiencing job satisfaction. Additionally, as the scarcity hypothesis and role conflict theory suggest (Greenhaus & Beutell, 1985; Marks, 1977), this finding suggests agriculture teachers might be susceptible to turnover due to changes in shifting resource requirements within either the work or family domain. For example, a teacher may experience acceptable levels of perceived WIF, but as family role requirements change, requiring additional time (e.g. the birth of a child, family conflicts, taking care of an aging family member) or the time required to complete their work increases (e.g. teaching unfamiliar coursework, adding a new career development team, larger class sizes), agriculture teachers may not be able to cope. Research should explore the relationship between unexpected time requirements within either the work or family domain and teacher turnover in agricultural education. Additionally, research should seek to determine the threshold of WFC that agriculture teachers are willing to endure before making the decision to seek employment elsewhere.

Because WIF was a significant factor in the model predicting turnover intentions, while FIW was not, the need for improving work domain characteristics of agriculture teachers exist. School administrators and the agricultural education profession should increase awareness of the conflict agriculture teachers experience when work responsibilities interfere with family life, creating the potential for teacher turnover. Perhaps policymakers and administrators could reduce WIF of agriculture teachers by providing flexible work options. One example might include expanding part-time agriculture teaching positions so teachers with heavy family commitments can still remain connected to agricultural education.

Agricultural educators facilitate powerful learning experiences for students. The agricultural education profession must ensure these powerful offerings do not come at the cost of detrimental WFC and agriculture teachers seeking a way out of the profession. Our research highlighted agriculture teachers perceived work family conflict in the form of their work obligations interfering with their family role. Leaders within agricultural education must consider the potential negative consequences of WIF, including turnover intentions, and methods for reducing WFC among teachers. The future of the agricultural education profession relies on our efforts to keep qualified teachers in the classroom; we must do our part.

References

Allen, T. D., Herst, D. E., Bruck, C. S. & Sutton, M. (2000). Consequences associated with work to family conflict: a review and agenda for future research. *Journal of Occupational Health Psychology, 5*, 278–308

Barnett, R. C. & Hyde, J. S. (2001). Women, men, work, and family: An expansionist theory. *American Psychologist*, *56*(10), 781-796.

Baxter, L., Stephens, C., & Thayer-Bacon, B. J. (2011). Perceptions and barriers of four female agricultural educators across generations: A qualitative study. *Journal of Agricultural Education*, *52*(4), 13-23.

Blackburn, J. J., & Robinson, J. S. (2008). Assessing teacher self-efficacy and job satisfaction of early career agriculture teachers in Kentucky. *Journal of Agricultural Education, 49*(3), 1-11. doi: 10.5032/jae.2008.03001

Bond, J. T., Galinsky, E. & Swanberg, J. E. (1998). The 1997 National Study of the Changing Workplace. (ERIC Document Reproduction Service No. 425871). Retrieved from http://eric.ed.gov/?id=ED425871.

Boone, H. N., & Boone, D. A. (2007). Problems faced by high school agricultural education teachers. *Journal of Agricultural Education*, *48*(2), 36-45. doi:10.5032/jae.2009.01021

Boyd, D., Lankford, H., Loeb, S., & Wyckoff, J. (2005). Explaining the short careers of high achieving teachers in schools with low-performing students. *American Economic Review*, 166-171.

Bruck, C. S., Allen, T. D., & Spector, P. E. (2002). The relation between work–family conflict and job satisfaction: A finer-grained analysis. *Journal of Vocational Behavior*, *60*(3), 336-353.

Byron, K. (2005). A meta-analytic review of work-family conflict and its antecedents. *Journal of Vocational Behavior, 67*, 169-198.

Camp, W. G., Broyles, T., & Skelton, N. S. (2002). *A national study of the supply and demand for teachers of agricultural education in 1999-2001*. Retrieved from http://aaaeonline.org/files/supply_demand/teachersupply2002.pdf

Cano, J., & Miller, G. (1992). An analysis of job satisfaction and job satisfier factors among six taxonomies of agricultural education teachers. *Journal of Agricultural Education*, *33*(4), 9-16. doi:10.5032/jae.1992.03040

Carlson, D. S., Kacmar, M. K. & Williams, L. J. (2000). Construction and validation of a multidimensional measure of work-family conflict. *Journal of Vocational Behavior, 56* (2), 249–76.

Castillo, J. X., Conklin, E. A., & Cano, J. (1999). Job satisfaction of Ohio agricultural education teachers. *Journal of Agricultural Education*, *40*(2), 19-27. doi:10.5032/jae.1999.02019

Chaney, C. A. (2007). *Work-life variables influencing attrition among beginning agriscience teachers of Texas* (Doctoral dissertation). Retrieved from http://repositories.tdl.org/

Chenevey, J. L., Ewing, J. C., & Whittington, M. S. (2008). Teacher burnout and job satisfaction among agricultural education teachers. *Journal of Agricultural Education*, *49*(3), 12-22. doi: 10.5032/jae.2008.03012

Cinamon, R. G., & Rich, Y. (2005). Work-family conflict among female teachers. *Teaching and Teacher Education, 21*, 365-378.

Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). New York, NY: John Wiley & Sons.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed). Hillsdale, NJ: Erlbaum.

Crouter, C. (1984). Spillover from family to work: the neglected side of the work–family interface. *Human Relations*, *37*, 425–42.

Crutchfield, N., Ritz, R., & Burris, S. (2013). Why agricultural educators remain in the classroom. *Journal of Agricultural Education*, *54*(2), 1-14. doi:10.5032/jae.2013.02001

Danielson, L. (2002). Developing and retaining quality classroom teachers through mentoring. *The Clearing House*, *75*(4), 183-185.

Darling-Hammond, L. (2000). *Solving the dilemmas of teacher supply, demand, and standards: How we can ensure a competent, caring, and qualified teacher for every child*. New York: National Commission on Teaching & America's Future. Retrieved from http://nctaf.org/wp-content/uploads/2012/01/supply-demand-standards.pdf

Dillman, D. A. (2007). *Mail and internet surveys: The tailored design method* (2nd ed.). Hoboken, NJ: John Wiley & Sons, Inc.

Doerfert, D. L. (Ed.) (2011). *National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015.* Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications. Retrieved from: http://aaaeonline.org/Resources/Documents/AAAE%20National%20Research%20Agenda.pdf

Duxbury, L., Higgins, C., & Lee, C. (1994). Work-family conflict: A comparison by gender, family type, and perceived control. *Journal of Family Issues, 15*, 449-466.

Edwards, M. C., & Briers, G. E. (1999). Assessing the inservice needs of entry-phase agriculture teachers in Texas: A discrepancy model versus direct assessment. *Journal of Agricultural Education, 40*(4), 40-49. doi: 10.5032/jae.1999.03040

Elfers, A. M., Plecki, M. L., & Knapp, M. S. (2006). Teacher mobility: Looking more closely at" the movers" within a state system. *Peabody Journal of Education, 81*(3), 94-127.

Eller, W. S., Doerfler, C. B., & Meier, K. J. (2000). *Teacher turnover in Texas: Problems and prospects.* A report of the Texas Educational Excellence Project. College Station: Texas A&M University. Retrieved from http://teep.tamu.edu/reports/report010.pdf

Flynt, S. W., & Morton, R. C. (2009). The teacher shortage in America: Pressing concerns. *National Forum of Teacher Education Journal, 19*(3), 1-5.

Foster, B. B. (2001). Choices: A dilemma of women agricultural education teachers. *Journal of Agricultural Education, 42*(3), 1-10. doi:10.5032/jae.2001.03001

Fu, C. K., & Shaffer, M. A. (2001). The tug of work and family: Direct and indirect domain-specific determinants of work-family conflict. *Personnel Review, 30*(5), 502-522.

Gignac, M.A., Kelloway, E.K. & Gottlieb, B.H. (1996). The impact of caregiving on employment: a mediational model of work–family conflict. *Canadian Journal on Aging, 15*(4), 525–42.

Gonzales, L., Brown, M. S., & Slate, J. R. (2008). Teachers who left the teaching profession: A qualitative understanding. *The Qualitative Report, 13*(1), 1-11.

Grady, T. L., & Burnett, M. F. (1985). The Relationship between Job Satisfaction and Performance of Vocational Agriculture Teachers. *Journal of Vocational Education Research, 10*(3), 53-69.

Grandey, A., & Cropanzano, R. (1999). The conservation of resources model applied to work–family conflict and strain. *Journal of Vocational Behavior, 54*(2), 350-370. doi: 10.1006/jvbe.1998.1666

Greenhaus, J. H., Collins, K. M., Singh, R. & Parasuraman, S. (1997). Work and family influences on departure from public accounting. *Journal of Vocational Behavior, 50*, 249–70.

Greenhaus, J. H., & Beutell, N. J. (1985). Sources of conflict between work and family roles. *Academy of Management Review, 10*(1), 76-88. doi: 10.2307/258214

Gutek, B. A., Searle, S., & Klepa, L. (1991). Rational versus gender role explanations for work-family conflict. *Journal of Applied Psychology*, *76*(4), 560-568. doi:510.1037/0021-9010.1076.1034.1560

Higgins, C., Duxbury, L., & Lee, C. (1994). Impact of life-cycle stage and gender on the ability to balance work and family responsibilities. *Family Relations*, *43*, 144–50.

Ingersoll, R. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal, 38,* 449-534.

Ingersoll, R. M., & Smith, T. M. (2003). The wrong solution to the teacher shortage. *Educational Leadership*, *60*(8), 30-33.

Kantrovich, A. J. (2007). *A national study of the supply and demand for teachers of agricultural education from 2004-2006.* American Association for Agricultural Education. Retrieved from http://aaaeonline.org/files/supply_demand/supplydemand07.pdf

Kantrovich, A. J. (2010). *A national study of the supply and demand for teachers of agricultural education from 2007-2009.* American Association for Agricultural Education. Retrieved from http://www.naae.org/links/resources/docs/2010-supply-Demand-study-report.pdf

Kelsey, K. D. (2006). Teacher attrition among women in secondary agricultural education. *Journal of Agricultural Education, 47*(3), 117-129. doi: 10.5032/jae.2006.03117

Kitchel, T., Smith, A. R., Henry, A. L., Robinson, J. S., Lawver, R. G., Park, T. D., & Schell, A. (2012). Teacher job satisfaction and burnout viewed through social comparisons. *Journal of Agricultural Education*, *53*(1), 31-44. doi: 10.5032/jae.2012.01031

Knight, J. A. (December, 1987). Current status of women teachers of vocational agriculture in Ohio and their perceptions of their place in the profession. *Proceedings of the National Agricultural Education Research Meeting*, 80, 223-236.

Kopelman, R. E., Rovenpor, J. L., & Millsap, R. E. (1992). Rationale and construct validity evidence for the Job Search Behavior Index: Because intentions (and New Year's resolutions) often come to naught. *Journal of Vocational Behavior, 40*, 269-287.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30,* 607-610.

Krieg, J. (2006). Teacher quality and attrition. *Economics of Education Review, 25,* 13-27.

Lemons L. (2013). *Do I stay or do I go? A mixed-methods study of factors of attrition as reported by leavers of secondary agriculture programs.* (Doctoral dissertation). Retrieved from https://repositories.tdl.org/ttu-ir/handle/2346/50626

Lindner, J. R., Murphy, T. H., & Briers, G. E. (2001). Handling nonresponse in social science research. *Journal of Agricultural Education, 42*(4), 43-53. doi: 10.5032/jae.2001.04043

Marks, S. R. (1977). Multiple roles and role strain: Some notes on human energy, time and commitment. *American Sociological Review*, *42*(1), 921-936. doi: 10.2307/2094577

McKim, A. J., & Velez, J. J. (2015). Exploring the relationship between self-efficacy and career commitment among early career agriculture teachers. *Journal of Agricultural Education*, *56*(1), 127-140. doi: 10.5032/jae.2015.01127

Miller, L. E., & Smith, K. L. (1983). Handling non-response issues. *Journal of Extension, 21*(5), 45-50.

Mundt, J. P., & Connors, J. J. (1999). Problems and challenges associated with the first years of teaching agriculture: A framework for preservice and inservice education. *Journal of Agricultural Education*, *40*(1), 38-48. doi:10.5032/jae.1999.01038

Murray, K., Flowers, J., Croom, B., & Wilson, B. (2011). The agricultural teacher's struggle for balance between career and family. *Journal of Agricultural Education*, *52*(2), 107-117. doi: 10.5032/jae.2011.02107

Myers, B. E., Dyer, J. E., & Washburn, S. G. (2005). Problems facing beginning agriculture teachers. *Journal of Agricultural Education*, *46*(3), 47-55. doi:10.5032/jae.2005.03047

National Center for Educational Statistics [NCES]. (2014). *Schools and Staffing Survey (SASS).* Retrieved from: https://nces.ed.gov/surveys/sass/

National FFA Organization (2014). *FFA membership.* Retrieved from https://www.ffa.org/about/who-we-are/our-membership

Netemeyer, R. G., Boles, J. S. & McMurrian, R. (1996). Development and validation of work–family conflict and family–work conflict scales. *Journal of Applied Psychology, 81*, 400–410.

Newcomb, L. H., Betts, S. I., & Cano, J. (1987). Extent of burnout among teachers of vocational agriculture in Ohio. *Journal of the American Association of Teacher Educators in Agriculture*, *28*(1), 26-33. doi:10.5032/jaatea.1987.01026

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York, NY: McGraw-Hill.

Ogungbamila, B. (2014). Work-Family Interference and Occupational Burnout among Employees in Service Occupations in Nigeria. *International Journal of Psychological Studies*, *6*(3), 71-79. doi: 10.5539/ijps.v6n3p71

Pleck, J. H. (1977). The work–family role system. *Social Problems, 24,* 417–442.

Ritz, R., Burris, S., & Brashears, T. (2013). The effects of a time management professional development seminar on stress and job satisfaction of beginning agriscience teachers in west Texas. *Journal of Agricultural Education, 54*(3), 1-14. doi: 10.5032/jae.2013.03001

Shen, J. (1997). Teacher retention and attrition in public schools: Evidence from SASS91. *Journal of Education Research, 91*(2), 81-95. doi: 10.1080/00220679709597525

Smith, T. M., & Ingersoll, R. M. (2004). What are the effects of induction and mentoring on beginning teacher turnover? *American Educational Research Journal, 41,* 681–714.

Sorensen, T. J., & McKim, A. J. (2014). Perceived work-life balance ability, job satisfaction, and professional commitment among agriculture teachers. *Journal of Agricultural Education*, *55*(4), 116-132. doi: 10.5032/jae.2014.04116

Swan, B. G. (2005). *The relationship between the 2004 Ohio State University Agricultural Education student teachers' learning style, teacher heart, and teacher sense of efficacy.* (Unpublished doctoral dissertation). The Ohio State University, Columbus.

Theobald, N. (1990). An examination of the influence of personal, professional, and school district characteristics on public school teacher retention. *Economics of Education Review, 9*(3), 241-250. doi: 10.1016/0272-7757(90)90005-P

Tippens, A., Ricketts, J. C., Morgan, A. C., Navarro, M., & Flanders, F. B. (2013). Factors related to teachers' intention to leave the classroom early. *Journal of Agricultural Education*, *54*(4), 58-72. doi: 10.5032/jae.2013.04058

Torres, R. M., Lawver, R. G., & Lambert, M. D. (2009). Job-related stress among secondary agricultural education teachers: A comparison study. Journal of Agricultural Education, 50(3), 100-111. doi: 10.5032/jae.2009.03100

Torres, R. M., Ulmer, J. D., & Aschenbrener, M. S. (2008). Workload distribution among agriculture teachers. *Journal of Agricultural Education*, *49*(2), 75. doi: 10.5032/jae.2008.02075

Vandenberg, R. J., & Nelson, J. B. (1999). Disaggregating the motives underlying turnover intentions: When do intentions predict turnover behavior?. *Human Relations*, *52*(10), 1313-1336.

Vieira, J. M., Lopez, F. G., & Matos, P. M. (2013). Further Validation of Work–Family Conflict and Work–Family Enrichment Scales among Portuguese Working Parents. *Journal of Career Assessment*, 00(0), 1-16. doi: 0.1177/1069072713493987.

Walker, W. D., Garton, B. L., & Kitchel, T. J. (2004). Job satisfaction and retention of secondary agriculture teachers. *Journal of Agricultural Education*, *45*(2), 28-38. doi:10.5032/jae.2004.02028

Westman, M., & Piotrkowski, C. S. (1999). Introduction to the special issue: Work–family research in occupational health psychology. *Journal of Occupational Health Psychology, 4*(4), 301-306. doi:10.1037/1076-8998.4.4.301

Wheeler, J., & Knobloch, N. A. (2006). Relationship of teacher and program variables to beginning agriculture teachers' sense of efficacy. *Proceedings of the National Agricultural Education Research Conference, Charlotte, NC, 33, 590-600.*

An Examination of the Relationship between Agriculture Teachers' Work Characteristics and Work-Family Conflict

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Abstract

We utilized data from a random sample of secondary agriculture teachers in the United States to explore work characteristics and their relationship to work-family conflict, specifically how the work role interfered with the family role. We first explored nine workplace characteristics (i.e. salary, work hours per work week, weekend work hours, years of teaching experience, number of agriculture teachers within the school, school community type, number of students per class, work salience, and perceived family-supportive work culture) by sex. Two of the workplace characteristics, years of teaching experience and salary, were significantly different for male and female agriculture teachers. We then analyzed the relationship between identified workplace characteristics and teachers' perceptions of their work role interfering with their family role. In total, the workplace variables accounted for 22% of the variance in teachers' perceptions of work interfering with their family. Four of the workplace variables (i.e. perceived family-supportive work culture, number of agriculture teachers per school, work salience, and work hours per work week) were statistically significant predictors of work interfering with family. Recommendations and implications for the agriculture teaching profession are discussed in light on these findings.

Introduction and Need for the Study

The national shortage of agriculture teachers (Kantrovich, 2010) has spurred investigation into reasons why teachers leave the profession. Research has identified the interface between work and family roles and teachers' ability to balance these intersecting roles as being related to career commitment (Crutchfield, Ritz, & Burris, 2013; Sorensen & McKim, 2014) and teacher turnover intentions (Sorensen, 2015). In this study, we sought to explore the interface between work and family by investigating the relationship between work characteristics and work-family conflict (WFC) among a national sample of agriculture teachers.

The catalyst for our investigation was the demanding nature of the agriculture teaching profession. Agriculture teachers are expected to complete traditional teacher roles in addition to responsibilities associated with total program management (e.g. FFA facilitation, SAE program management, and facilities management; Torres, Ulmer, & Aschenbrener, 2008). The pressure to coordinate and manage these responsibilities pushes many agriculture teachers to work extra hours, limiting the time available for other life roles, including family (Foster, 2001). Research outside of agricultural education has identified this issue, referred to as WFC, as associated with job dissatisfaction, stress, and intentions to quit (Allen, Herst, Bruck, & Sutton, 2000; Bruck, Allen, & Spector, 2002).

Research on the topic of WFC has expanded immensely over the past few decades (Eby, Casper, Lockwood, Bordeaux, & Brinley, 2005); however, little research has been done within education (Cinamon & Rich, 2005). A more complete understanding of WFC is needed to develop and implement effective strategies to reduce WFC and increase teacher retention. Additionally, exploring the workplace characteristics related to WFC within agricultural education may help identify the aspects of the profession that put agriculture teachers at risk of exiting the profession early.

Theoretical Framework

We utilized the role conflict theory (Greenhaus & Beutell, 1985) to frame our analysis. The role conflict theory states negative psychological effects occur when individuals unsuccessfully balance work and non-work roles. The inability to balance work and family roles leads to WFC, defined as "conflict in which the role pressures from the work and family domains are mutually incompatible in some respect" (Greenhaus & Beutell, 1985, p. 77). Foundational to the role conflict theory is the scarcity hypothesis, which states limited time and energy resources expended in one role deplete those resources available for other roles, which leads to WFC and diminished role quality in the role receiving fewer resources (Gutek, Searle, & Klepa, 1991). In this study we explored the relationship between workplace characteristics and WFC among agriculture teachers; we felt this analysis would provide insight into the aspects of the agriculture teaching profession that are pulling resources away from teachers' family lives, causing WFC.

An important characteristic of the role conflict theory is the bi-directional nature of WFC, that is, conflict can take the form of work interference with family (WIF) or family interference with work (FIW). As this study was focused on the relationship between workplace characteristics and WFC, we focused on WIF. An additional characteristic of WFC is its multidimensionality; it can occur as time-based conflict, strain-based conflict, or behavior-based conflict. Due to the large time requirements associated with being an agriculture teacher (Torres et al., 2008), we limited our study to time-based conflict. Time-based conflict occurs when multiple roles compete for a finite amount of time. For example, an agriculture teacher often must choose between staying late at school to coach career development event teams or returning home and taking care of family responsibilities.

Literature Review

With the role conflict theory established as a framework, we turned our attention to previous research on two important considerations in our analysis of the relationship between workplace characteristics and WFC. We first explored existing research on the dependent variable in this relationship, WFC. We then analyzed existing research addressing potential workplace characteristics that should be considered as potential influencers to WFC.

Work-Family Conflict

Since the industrialization period, the interface between work and family domains has become a major concern for employees, families, and society (Westman & Piotrkowski, 1999). As workforce demographics evolved and traditional gender roles changed, the boundaries between work and family have become less defined (Gignac, Kelloway, & Gottlieb, 1996). With advances in technology, more people are able to work from home. Furthermore, many in the workplace, including teachers, bring tasks from their job to be completed while occupying the family role. The spillover of work and family roles has increased the potential for WFC (Crouter, 1984).

Research on WFC has expanded over the past few decades due to societal changes in family structures (e.g. men assuming more family responsibilities) and the changing demographic composition (e.g. more females) of the workforce (Eby et al., 2005; Galinsky, Aumann, & Bond, 2011). Studies exploring the impact of WFC identified its relationship to a number of negative workplace outcomes, including low occupational well-being, poor work performance, low organizational commitment, job dissatisfaction, increased job stress, high intentions to quit, and actual turnover (Allen et al., 2000; Bruck et al., 2002; Burke, 1988; Grandey & Cropanzano, 1999; Hepburn & Barling, 1996; MacEwen & Barling, 1994). Among the negative workplace outcomes, turnover intentions and actual turnover have been found to have the strongest relationships with WFC (Allen et al., 2000; Grandey & Cropanzano, 1999; Greenhaus, Collins, Singh, & Parasuraman, 1997; Netemeyer, Boles, & McMurrian, 1996).

It is important to note, few occupations have a system free of WFC. In fact, research suggests 70 percent of employees do not have a healthy balance between work and personal lives, and the strain associated with the struggle to balance has worsened over the past few decades (Galinsky et al., 2011). Despite the popular idea that teaching is a profession characterized by a schedule and workload enabling balance between work and family roles, research has shown otherwise. A recent study found female teachers experience WFC at the same level and frequency as females in other high stress occupations such as lawyers and computer professionals (Cinamon & Rich 2005). However, a dearth of literature exists on the WFC experienced by agriculture teachers. The agricultural education profession is characterized by high work expectations (Torres et al., 2008); therefore, research addressing the time-based WFC experienced by agriculture teachers is essential.

Workplace Characteristics to Consider

Given that time-based conflict is a foundational component of WFC, it is no surprise research has identified a positive relationship between the number of hours worked and WFC (Beutell & Wittig-Berman, 1999; Mesmer-Magnus & Viswesvaran, 2005). Although operationalized differently, studies in agricultural education have begun to link time commitment and WFC. Specifically, research has identified the amount of work hours an agriculture teacher spends at work is a strong predictor of high teacher stress (Lambert, Ball, & Tummons, 2011; Torres, Lawver, & Lambert, 2009). Newcomb, Betts and Cano, (1987) stated agriculture instructors complain about having more work to do than is “humanly possible” (p. 26). Furthermore, research suggests working long hours (Miller & Scheid, 1984; Moore & Camp, 1979; Mundt & Connors, 1999) is one of the major challenges faced by agriculture teachers. In our study, we included the hours agriculture teachers worked during the week and the weekend as potential variables influencing WFC.

Research has also identified role salience as an important determinant of WFC. Greenhaus and Beutell (1985) proposed WFC grows when either work or family roles become more central to an individual’s life. Research suggests individuals will invest more time and energy into roles they consider to be important to them, allowing less time and energy for other roles. Following this logic, one would assume a positive relationship between work salience and WFC. Given the importance of work salience, we considered agriculture teachers’ work salience in our analysis of the relationship between workplace characteristics and WFC.

In addition to work salience, research suggests perceptions of family support within the workplace to be negatively related to WFC (Booth & Matthews, 2012; Kossek, Pichler, Bodner, & Hammer, 2011; Lapierre & Allen, 2006). In other words, as an individual perceives their workplace to be more supportive of their family role, the less WFC they experience. Scholars suggest the impact of a family-supportive work culture and WFC has been understudied (Kossek et al., 2011). As we explored the relationship between workplace characteristics and WFC, we included teachers’ perceptions of a family-supportive work culture.

Experience within a profession is also important to consider when examining WFC. Grzywacs and Marks (2000) found younger employees reported more WFC than older employees. This research highlights the more experience an employee has the more likely he or she has gained the necessary expertise to manage work demands without infringing upon family responsibilities (Cinamon & Rich, 2005). Therefore, we considered teachers’ years of classroom experience in our analysis of the relationship between workplace factors and WFC.

Due to traditional role expectations that work is more important for men and family more important for women, sex is often considered in studies exploring antecedents of WFC (Pleck, 1977). In the 1970’s and 1980’s when the influx of women into the workforce escalated, WFC research generally focused on women. However, over the past several decades, WFC research has expanded to include men (Barnett, Marshall, & Pleck, 1992; Fox, Fonseca, & Bao, 2011; Kinnunen & Mauno, 1998; Morgan, 2014). Within agricultural education, some research suggests females experience more WFC than males (Murray, Flowers, Croom, & Wilson, 2011) while other research suggests sex does not influence an individual’s ability to balance work and family (Sorensen & McKim, 2014). Due to the inconsistencies in agricultural education research, we included sex as a control variable within our analysis of the relationship between workplace characteristics and WFC. Additionally, as the proportion of female agriculture teachers in the profession continues to increase (Camp, Broyles, & Skelton, 2002; Foster, Lawver, & Smith, 2014; Kantrovich, 2010), research exploring WFC by sex is timely.

Four additional workplace variables (i.e. number of agriculture teachers per school, school community type, salary, and number of students per class) were considered as potential time-based influencers to how agriculture teachers experienced WFC. We felt these additional variables had the potential to influence how secondary agriculture teachers experienced and/or perceived workplace obligations interfering with their family role.

Purpose and Objectives

The purpose of this study was to describe nine workplace characteristics (i.e. salary, work hours per work week, weekend work hours, years of teaching experience, number of agriculture teachers per school, school community type, average number of students per class, work salience, and perceived family-supportive work culture) among secondary agriculture teachers. Additionally, we sought to determine the relationship between workplace characteristics and WFC. Given the link between WFC and turnover (Allen et al., 2000; Grandey & Cropanzano, 1999; Greenhaus et al., 1997; Netemeyer et al., 1996), this research informed Priority Area Number three of the National Research Agenda which calls for research assessing the "adequate number of well-prepared, highly effective agricultural educators, communicators, and leaders" (Doerfert, 2011, p. 20). The following research objectives were developed to guide our study.

1. Describe the sample of agriculture teachers.
2. Describe the work domain characteristics of agriculture teachers by sex.
3. Describe work-family conflict (WFC) of agriculture teachers; specifically work interference with family (WIF).
4. Determine the relationships between work characteristics and WIF.

Methods

This study utilized survey research to collect information on agriculture teachers' workplace characteristics and WFC. The survey instrument was designed and distributed to a random sample of agriculture teachers in the United States using the online survey system Qualtrics. Online survey methodology was useful for this nationwide study because of the advantages it provided, including low costs, data collection from a large geographical area, and relative ease to input collected data from a large population of sample (Dillman, 2007).

The target population consisted of all secondary agriculture teachers in the United States during the 2014-2015 school year that self-identified as being active participants in a family role. A secondary agriculture teacher was defined as an individual with a full-time or part-time assignment to teach agriculture courses in middle and/or high schools. Active participation in a family role was defined as "any and all committed relationships that might influence how time is invested in the non-work domain." This distinction was imperative given our interest in exploring how work characteristics influenced the interaction between work and family roles.

Since it is required that all chartered agriculture programs have FFA, and that agriculture teachers be listed as FFA advisors, the National FFA Organization was utilized as the source of participant contact information. According to the National FFA Organization, there were over 11,000 agriculture teachers in the United States when the study was conducted (National FFA Organization, 2014). The appropriate sample size was determined based on Cochran's (1977) and Krejcie and Morgan's (1970) sample size determinant formulas. This study targeted a simple random sample from the entire population of secondary agriculture teachers in the United States. A sample frame of 778 agriculture teachers was obtained from the National FFA Organization and consisted only of names and email addresses.

Questions pertaining to the work domain consisted of agriculture teachers' actual time invested in work (weekend hours per month and work hours per regular work week), salary, years of teaching experience, number of agriculture teachers per school, average number of students per class, school community type (i.e. urban, suburban and rural) as well as two characteristics measured using constructs, work role salience and perceived family-supportive work culture. Work role salience was measured using a six-item construct adopted from Noor (2004). Participants rated each item on a 6-point scale (from 1 "Strongly Disagree to 6 "Strongly Agree"), with higher scores indicating higher work salience. Sample items included "my personal life goals are work-oriented" and "the major satisfaction in my life comes from work." The work salience construct has been tested for reliability with Cronbach's alphas ranging from .76 to .78 (Chang, Shen, & Chi, 2014; Noor, 2004). Perceived family-supportive work culture was measured using a seven-item construct adopted from Harrington, Deusen, and Humberd (2011). Participants rated each item on a six-point scale (from 1 "Strongly Disagree to 6 "Strongly Agree"), with higher scores indicating higher perceived family-supportive work culture. Sample items included "my co-workers are understanding when I have family business to take care of" and "I feel comfortable sharing my family issues with colleagues."

In addition to analyzing workplace characteristics, we analyzed teachers perceptions of work interference with family (WIF). We utilized the three item sub-construct of the work family conflict scale (WFCS; Carlson Kacmar, & Williams, 2000) to measure WIF. Participants rated each item on a six-point scale (from 1 "Strongly Disagree to 6 "Strongly Agree"), with higher scores indicating greater conflict. Sample items for the WIF construct included "my work keeps me from my family activities more than I would like" and "I have to miss family activities due to the amount of time I must spend on work responsibilities." The WFCS has been used extensively in research and has been found to be reliable and valid (Bruck et al., 2002; Carlson et al., 2000; Fu & Shaffer, 2001; Ogungbamila, 2014; Vieira, 2013).

A panel of experts consisting of doctoral students in the College of Education and professors in the College of Agriculture at Oregon State University examined and critiqued the instrument for content and face validity. Construct reliability estimates for each construct were estimated using a pilot test of 30 career and technical education teachers in Oregon. Since the survey instrument was administered only once, Cronbach's alpha coefficients were used for the reliability estimates. According to Nunnally (1994), reliability estimates should meet or exceed an alpha of .70 to be considered reliable. All of the constructs in this study's instrument exceeded the alpha of .70 (see Table 1).

Table 2
Construct Reliability Estimates of the Survey Instrument (n = 30)

Construct	Cronbach's α
Work Salience	.83
Family-Supportive Work Culture	.80
Work Interference with Family (WIF)	.92

We followed Dillman's (2007) tailored design method to collect data from participants. Non-response bias was handled using the guidelines outlined by Lindner, Murphy, and Briers (2001). Due to the limited contact information provided in the frame, no attempt was made to contact non-respondents by telephone. Thus, as recommended by Lindner et al. (2001), on-time respondents (n = 199) were compared with late-respondents (n = 35) to determine if any systematic differences existed. No statistically significant differences existed between on-time and late respondents within the variables of interest. Therefore, we considered non-response error to be insignificant to this study (Lindner et al., 2001; Miller & Smith, 1983).

Respondents who did not meet the population parameters (i.e. those who were not secondary agriculture teachers and/or who self-reported not being a family role participant) were excluded from the sample frame. In total, 34 participants did not meet the population parameters for the study and a total of 75 participants' emails "bounced." Therefore, these 109 participants were removed from the database prior to analysis. After making these adjustments, 234 usable surveys were collected out of 667 total potential participants, yielding a response rate of 35.08% (n = 234). The data were downloaded into the Statistical Package for the Social Sciences (SPSS) version 20.0 for analysis.

Research objective one (i.e. describe the sample of agriculture teachers), research objective two (i.e. describe work domain characteristics by sex), and research objective three (i.e. describe work-family conflict of agriculture teachers; specifically work interference with family) were accomplished by determining and reporting frequencies, percentages, means, and standard deviations. Where applicable, we performed independent samples t-tests and Chi-square tests to determine the differences between male and female respondents. For significant differences, effect sizes were measured and reported using appropriate statistical measures (Cohen, 1988). In order to accomplish research objective four (i.e. determine the relationship between work characteristics and WIF), an ordinary least squares (OLS) regression was performed. The independent variables in this regression included salary, work hours per work week, weekend work hours, years of teaching experience, number of agriculture teachers per school, school community type, average number of students per class, work salience, and perceived family-supportive work culture with the dependent variable being WIF. Sex was included in the model as a control variable. A total of 10 predictor variables were entered into the regression analysis. According to Green (1991), to ensure stability and sufficient power when testing a model, a minimum sample size of $50 + 8k$ is recommended (where k is the number of predictors). With 10 variables entered, we needed no less than 130 respondents; this criteria was met by our sample size (n =234). Betas, standardized betas, and overall R^2 were calculated and reported for the regression analysis.

Before conducting data analyses, we considered the assumptions of parametric data as well as the assumptions of regression. Regarding the assumptions of parametric data, we found the variances to be the same throughout the data and the data to be independent. However the variables monthly weekend work hours and work hours per week, were not normally distributed due to extreme outliers. To deal with this issue, we trimmed and replaced outlier values with the value of the most extreme response that was not identified as a statistical outlier (four standard deviations from the mean), a method called the semi-Winsorized approach (Guttman & Smith, 1969; Moyer & Geissler, 1991). According to Guttman and Smith (1969), Winsorized means are robust estimators of the population mean. Before data analysis, we also checked the assumptions of regression (e.g., variance, collinearity, homoscedasticity, linearity between predictor and outcome variables) and found the data met all of the assumptions.

Findings

Selected demographic information was collected from respondents (*n* = 234) to accomplish research objective one (i.e. describe the sample of agriculture teachers). Of the responding teachers, 40.08% were female and 59.91% were male. Respondents ranged from 22 to 69 years old with a mean age of 40.26. The majority of responding teachers (93.42%) self-identified as "White, European American, Non-Hispanic," "Hispanic or Latino American" was the next highest reported ethnicity (1.75%). At the time of data collection, 93.24% of responding teachers were married and 72.22% of respondents indicated they had children.

Research objective two sought to describe the work characteristics of responding agriculture teachers by sex. Seven of the nine work characteristics were continuous in nature; a summary of these variables are reported in table two.

Table 2

Continuous Work Domain Characteristics by Sex

Variable	Total (*n* = 227)		Female (*n* = 91)[1]		Male (*n* = 136)[1]				
	M	*SD*	*M*	*SD*	*M*	*SD*	*t*	*p*-value	Cohen's *d*
Work Hours per Work Week	55.77	10.34	57.13	8.23	54.82	11.52	1.64	.102	0.23
Monthly Weekend Work Hours	18.07	14.90	18.24	14.62	17.95	15.14	0.14	.891	0.02
Teaching Experience	13.99	10.22	8.62	7.60	17.75	10.15	7.65	<.001	1.02
Number of Agriculture Teachers	1.96	1.31	1.89	1.17	2.01	1.40	0.61	.540	0.09
Students per Class	20.19	7.83	20.14	8.92	20.22	7.01	0.07	.943	0.01
Work Salience	4.05	0.85	4.08	0.76	4.03	0.89	0.39	.694	0.06
Family-Supportive Work Culture	3.96	0.91	3.99	0.89	3.93	0.91	0.49	.628	0.07

Note. Work salience and family-supportive work culture were measured on six point scales from 1 "Strongly Disagree" to 6 "Strongly Agree."
[1]Seven teachers declined to respond.

For six of the seven continuous workplace variables (i.e. work hours per work week, monthly weekend work hours, number of agriculture teachers within the school, average number of students per class, work salience, and perceived family-supportive work culture), we discovered no statistically significant differences in the variables between male and female respondents. The only continuous workplace variable that differed significantly by sex was years of teaching experience (p-value < .001). Regarding years of teaching experience, males (M = 17.75) had, on average, 9.13 more years of teaching experience than females (M = 8.62). Furthermore, sex was found to have a large effect (Cohen, 1988) on years of teaching experience (Cohen's d = 1.02).

Salary was measured using categorical data to decrease respondent burden (see Table 3). Most of the teachers (78.8%) reported salaries of between $35,000 and $75,000. Two teachers reported making less than $25,000, while twelve teachers reported a salary over $85,000. When comparing salary by sex, males tended to report statistically significant higher salaries than females ($\chi^2(7) = 18.03$, $p = .012$). More males than females reported earning one of the four highest salary options (i.e. $55,000 and above) whereas more females than males reported earning one of the four lowest salary intervals (i.e. under $55,000).

Table 3

Comparison of Responding Teachers' Salaries by Sex

Salary Intervals	Total		Female		Male	
	f	%	*f*	%	*f*	%
Under $25,000	2	0.9	1	1.1	1	0.7
$25,000 - $34,999	16	7.1	7	7.7	9	6.6
$35,000 - $44,999	49	21.7	31	34.1	18	13.1
$45,000 - $54,999	56	24.8	25	27.5	31	22.6
$55,000 - $64,999	36	15.9	10	11.0	26	19.0
$65,000 - $74,999	37	16.4	9	9.9	28	20.4
$75,000 - $84,999	18	8.0	7	7.7	11	8.0
$85,000 or more	12	5.3	1	1.1	11	8.0

School community type was also measured using categorical data. Respondents self-identified the type of community their school was located within. Of respondents, 10.3% indicated their workplace school was located in an urban setting, 23.2% indicated teaching in a suburban setting, and 66.5% indicated teaching in a rural setting. Differences between reported school community type were statistically insignificant for males and females (p-value = .333).

The third research objective sought to describe the work-family conflict of agriculture teachers; specifically teachers' perceptions of work interfering with family (WIF). Overall, agriculture teachers reported moderately high levels of WIF (M = 4.58). There were no statistically significant differences between male (M = 4.63) and female (M = 4.54) agriculture teachers regarding their perception of WIF (p-value = .545). Furthermore, effect size measurements indicated sex had a negligible effect on teachers' WIF (Cohen's d = 0.08).

The final objective (i.e. determine the relationships between work characteristics and WIF) was accomplished by running an OLS regression with the workplace characteristics as independent variables, WIF as the dependent variable, and teacher sex as a control variable (see Table 4). The independent variables, in combination, comprised a significant model (p-value < .001) and predicted 22% (R^2 = .22) of the variance in WIF. Four independent variables were significant in their prediction of WIF. Using the standardized coefficients (β) to determine the strength of the relationship between independent and dependent variables, we found perceived family-supportive work culture to be the strongest predictor of WIF (β = -.29). Additionally, the number of agriculture teachers (β = .18), work salience (β = .17), and work hours per work week (β = .15), were identified as statistically significant predictors of WIF.

Table 4

Relationship between Workplace Characteristics and WIF

	Dependent Variable: WIF					
Variable	Zero-order correlation (r)	p-value	B	SEB	β	p-value
Sex (control)	.04	.545	.17	.16	.08	.252
Salary	.03	.671	.06	.18	.03	.759
Work Hours per Work Week	.27	<.001	.02	.01	.15	.033
Monthly Weekend Work Hours	.08	.090	-.01	.01	-.04	.589
Teaching Experience	.04	.586	-.01	.01	-.12	.194
Number of Agriculture Teachers	.18	.009	.15	.06	.18	.011
School Community Type	-.02	.755	.20	.17	.09	.239
Students per Class	.09	.208	-.01	.01	-.03	.672
Work Salience	.14	.028	.18	.08	.17	.009
Family-Supportive Work Culture	.30	.004	-.34	.08	-.29	<.001

Note. R = .46, R^2 = .22, F = 5.23, p-value < .001. Work salience and perceived family-supportive work culture items scaled from 1 "Strongly Disagree" to 6 "Strongly Agree." Sex coded 0 = female, 1 = male. Salary coded 0 = below $55,000, 1 = $55,000 or above. School community type coded 0 = urban/suburban, 1 = rural.

Conclusions/Implications/Recommendations

The purpose of this research was to provide a national analysis of agriculture teachers' workplace characteristics and the relationship between workplace variables and work-family conflict. Given the strenuous nature of the agricultural education profession (Torres et al., 2008) and the identified agriculture teacher shortage (Kantrovich, 2010), research exploring the agricultural education workplace and its relationship to WFC is both timely and relevant. The first research objective in this analysis sought to describe responding agriculture teachers. These findings illustrate the sample of respondents mirror recent demographic trends reported within the agricultural education profession (Foster et al., 2014; Kantrovich, 2010).

Research objective two sought to describe the workplace characteristics of responding agriculture teachers. Differences between male and female teachers were discovered within teaching experience and salary. These findings are most likely a function of the profession's changing demographics over the past few decades (Camp et al., 2002, Foster et al., 2014, Kantrovich, 2010). The increase in female agriculture teachers has happened slowly over time; therefore the majority of older and more experienced teachers are male, while the younger teachers are female. As most teacher salaries are largely based on years of teaching experience, it is likely the younger teachers, who are more likely to be female, will report lower salaries than the older teachers, who are more likely to be male. However, caution should be taken to assume the absence of any gender bias in agricultural education in relation to salary (Kelsey, 2006) since the opportunity to receive stipends and extended contracts may not be as defined.

The third research objective sought to describe agriculture teachers' WFC in the form of work interfering with family. Respondents indicated moderately high levels of WIF, suggesting agriculture teachers experience psychological role strain as work demands interfere with family responsibilities. Work as an agriculture teacher is filled with many challenges, including trying to allocate time resources to a demanding work schedule while also attending to family domain responsibilities (Crutchfield et al., 2013; Murray et al., 2011). Given agriculture teachers in our study worked close to 60 hours per week, including weekends, during the school year it is no surprise work interferes with family. Research outside of agricultural education linking WFC and turnover (Allen et al., 2000; Grandey & Cropanzano, 1999; Greenhaus et al., 1997; Netemeyer et al., 1996) should serve as a catalyst for research and initiatives focused on developing agriculture teachers' workplace efficiency and/or reducing the time burden of the agriculture teaching profession.

The final research objective sought to determine the relationship between work characteristics and WIF. In combination, the nine predictor variables (i.e. salary, work hours per work week, weekend work hours, years of teaching experience, number of agriculture teachers per school, school community type, average number of students per class, work salience, and perceived family-supportive work culture), with sex as a control variable, predicted 22% of the variance in time-based WIF. Four independent variables (i.e. perceived family-supportive work culture, number of agriculture teachers per school, work salience, and work hours per work week) were found to significantly predict respondents' WIF.

The strongest predictor of agriculture teachers' WIF was perceptions of a family supportive work culture. Our research indicates as teachers perceived their work culture to be more supportive of families, their WIF decreases significantly. Unfortunately, our study also found respondents reported their work culture was only moderately supportive of the family role. Research is needed to uncover the specific characteristics of a work culture that led some teachers to perceive their workplace as supportive of their families. Once these characteristics are identified, consideration can be given to the feasibility of implementing these structures within more agricultural education programs and/or schools.

The second stronger predictor of agriculture teachers' WIF was the number of agriculture teachers within the school. Some might expect agriculture teachers in multi-teacher programs would be more likely to share responsibilities and therefore have a less demanding work role. However, our findings suggest increased number of agriculture teachers is related to higher WIF. A potential explanation is more agriculture teachers indicate a larger program with the potential of larger class sizes, more paperwork, and perhaps more responsibilities. Additionally, research has found when tasks are taken off agriculture teachers' workload, like we hope occurs in multi-teacher programs, teachers fill the saved time with more work activities (Lambert et al., 2011). Research is needed to understand how work is distributed among multi-teacher programs and how collaborations between agriculture teachers can reduce, rather than fuel, WIF.

In addition to family-supportive work culture and the number of agriculture teachers within the school, our research identified work salience as a significant predictor of WIF. Greenhaus and Beutell (1985) proposed WFC is intensified when either work or family roles are salient to an individual. They argued the more important a role is to an individual, the more time an individual will invest in that role, leaving less time and energy for other roles. The significant, positive relationship between work salience and WIF supports the notion that role salience intensifies WFC. Professional development and instruction should prepare agriculture teachers to balance work and family roles given fluctuating salience in either role. This could be especially helpful when teachers experience major family events (e.g. marriage, birth of a child) and/or changing expectations within their work role (e.g. leadership position within professional organization, growing FFA program).

The final significant predictor of WIF within our model was work hours per work week. According to the role conflict theory, the amount of WFC a person experiences increases proportionally with the number of hours he or she spends in either the work or family domain (Duxbury, Higgins, & Lee, 1994; Gutek et al., 1991). Agriculture teachers in this study reported working over 55 hours per week, not including weekends, at their jobs. Therefore, identifying a statistically significant, positive relationship between the number of work hours per work week and WIF supports the role conflict theory. Additionally, this finding supports previous recommendations to develop agriculture teachers' workplace efficiency and/or reduce the time burden of the agriculture teaching profession.

This research provides valuable insight, on a national scale, into the relationship between workplace variables and WFC among secondary agriculture teachers. However, this research is only a step toward the agricultural education profession supporting teachers' balance between work and family roles. The importance of the continued viability of the agricultural education profession compels continued efforts to provide agriculture teachers with the skills and work environment necessary to successfully balance their work and family roles.

References

Allen, T. D., Herst, D. E., Bruck, C. S. & Sutton, M. (2000). Consequences associated with work to family conflict: a review and agenda for future research. *Journal of Occupational Health Psychology, 5*, 278–308

Barnett, R. C., Marshall, N. L., & Pleck, J. H. (1992). Men's multiple roles and their relationship to men's psychological distress. *Journal of Marriage and the Family*, *54*(2), 358-367.

Beutell, N. J., & Wittig-Berman, U. (1999). Predictors of work-family conflict and satisfaction with family, job, career, and life. *Psychological Reports*, *85*(3), 893-903.

Booth, S. M., & Matthews, R. A. (2012). Family-supportive organization perceptions: Validation of an abbreviated measure and theory extension. *Journal of Occupational Health Psychology*, *17*, 41-51.

Bruck, C. S., Allen, T. D., & Spector, P. E. (2002). The relation between work–family conflict and job satisfaction: A finer-grained analysis. *Journal of Vocational Behavior*, *60*(3), 336-353.

Burke, R. J. (1988). Some antecedents and consequences of work-family conflict. *Journal of Social Behavior and Personality, 3*, 287–302.

Camp, W. G., Broyles, T., & Skelton, N. S. (2002). *A national study of the supply and demand for teachers of agricultural education in 1999-2001*. Retrieved from http://aaaeonline.org/files/supply_demand/teachersupply2002.pdf

Carlson, D. S., Kacmar, M. K. & Williams, L. J. (2000). Construction and validation of a multidimensional measure of work-family conflict. *Journal of Vocational Behavior, 56* (2), 249–76.

Chang, A., Chen, S. C., & Chi, S. C. S. (2013). Role salience and support as moderators of demand/conflict relationships in China. *European Journal of Work and Organizational Psychology*, *23*(6), 859-874.

Cinamon, R. G., & Rich, Y. (2005). Work-family conflict among female teachers. *Teaching and Teacher Education, 21*, 365-378.

Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). New York, NY: John Wiley & Sons.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed). Hillsdale, NJ: Erlbaum.

Crouter, C. (1984). Spillover from family to work: the neglected side of the work–family interface. *Human Relations, 37*, 425–42.

Crutchfield, N., Ritz, R., & Burris, S. (2013). Why agricultural educators remain in the classroom. *Journal of Agricultural Education, 54*(2), 1-14. doi:10.5032/jae.2013.02001

Dillman, D. A. (2007). *Mail and internet surveys: The tailored design method* (2nd ed.). Hoboken, NJ: John Wiley & Sons, Inc.

Doerfert, D. L. (Ed.) (2011). *National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015*. Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications. Retrieved from: http://aaaeonline.org/Resources/Documents/AAAE%20National%20Research%20Agenda.pdf

Duxbury, L., Higgins, C., & Lee, C. (1994). Work-family conflict: A comparison by gender, family type, and perceived control. *Journal of Family Issues, 15*, 449-466.

Eby, L. T., Casper, W. J., Lockwood, A., Bordeaux, C, & Brinley, A. (2005). Work and family research in IO/OB: Content analysis and review of the literature (1980-2002). *Journal of Vocational Behavior, 66*, 124-197.

Foster, B. B. (2001). Choices: A dilemma of women agricultural education teachers. *Journal of Agricultural Education, 42*(3), 1-10. doi:10.5032/jae.2001.03001

Foster, D. D., Lawver, R. G., & Smith, A. R. (2014). *National agricultural education supply & demand study: 2014 executive summary.* A report from the American Association for Agricultural Education. Retrieved from http://aaaeonline.org/Resources/Documents/NSDSummary_3_1_2015_Final.pdf.

Fox, M. F., Fonseca, C., & Bao, J. (2011). Work and family conflict in academic science: Patterns and predictors among women and men in research universities. *Social Studies of Science*, *41*(5), 715-735.

Fu, C. K., & Shaffer, M. A. (2001). The tug of work and family: Direct and indirect domain-specific determinants of work-family conflict. *Personnel Review*, *30*(5), 502-522.

Galinsky, E., Aumann, K., & Bond, J. T. (2011). *Times are changing: Gender and generation at work and at home.* New York: Families and Work Institute.

Gignac, M.A., Kelloway, E.K. & Gottlieb, B.H. (1996). The impact of caregiving on employment: a mediational model of work–family conflict. *Canadian Journal on Aging, 15*(4), 525–42.

Grandey, A., & Cropanzano, R. (1999). The conservation of resources model applied to work–family conflict and strain. *Journal of Vocational Behavior*, *54*(2), 350-370. doi: 10.1006/jvbe.1998.1666

Green, S. B. (1991). How many subjects does it take to do a regression analysis? *Multivariate Behavioral Research, 26,* 499-510.

Greenhaus, J. H., Collins, K. M., Singh, R. & Parasuraman, S. (1997). Work and family influences on departure from public accounting. *Journal of Vocational Behavior, 50*, 249–70.

Greenhaus, J. H., & Beutell, N. J. (1985). Sources of conflict between work and family roles. *Academy of Management Review*, *10*(1), 76-88. doi: 10.2307/258214

Grzywacz, J. G., & Marks, N. F. (2000). Reconceptualizing the work–family interface: An ecological perspective on the correlates of positive and negative spillover between work and family. *Journal of Occupational Health Psychology*, *5*(1), 111-126. doi: 10.1037/1076-8998.5.1.111

Gutek, B. A., Searle, S., & Klepa, L. (1991). Rational versus gender role explanations for work-family conflict. *Journal of Applied Psychology*, *76*(4), 560-568. doi:510.1037/0021-9010.1076.1034.1560

Guttman, I., & Smith, D. E. (1969). Investigation of rules for dealing with outliers in small samples from the normal distribution: I: Estimation of the mean. *Technometrics*, *11*(3), 527-550.

Harrington, B., Van Deuson, F., & Humberd, B. (2011). *The new dad: Caring, committed and conflicted.* A report from Boston College Center for Work and Family. Retrieved from http://www.bc.edu/content/dam/files/centers/cwf/pdf/FH-Study-Web-2.pdf

Hepburn, C. G., & Barling, J. (1996). Eldercare responsibilities, interrole conflict, and employee absence: A daily study. *Journal of Occupational Health Psychology, 1*, 311–318.

Kantrovich, A. J. (2010). *A national study of the supply and demand for teachers of agricultural education from 2007-2009.* American Association for Agricultural Education. Retrieved from http://www.naae.org/links/resources/docs/2010-supply-Demand-study-report.pdf

Kelsey, K. D. (2006). Teacher attrition among women in secondary agricultural education. *Journal of Agricultural Education, 47*(3), 117-129. doi: 10.5032/jae.2006.03117

Kinnunen, U., & Mauno, S. (1998). Antecedents and outcomes of work–family conflict among employed women and men in Finland. *Human Relations, 51*, 157–77.

Kossek, E. E., Pichler, S., Bodner, T., & Hammer, L. (2011). Workplace social support and work-family conflict: A meta-analysis clarifying the influence of general and work-family specific supervisor and organizational support. *Personnel Psychology, 64*, 289-313.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30,* 607-610.

Lambert, M. D., Ball, A. L., & Tummons, J. D. (2011). How do early career agriculture teachers talk about their time? *Journal of Agricultural Education*, *52*(3), 50-63. doi: 10.5032/jae.2011.03050

Lapierre, L. M., & Allen, T. D. (2006). Work-supportive family, family-supportive supervision, use of organizational benefits, and problem-focused coping: implications for work-family conflict and employee well-being. *Journal of Occupational Health Psychology, 11*, 169-181.

Lindner, J. R., Murphy, T. H., & Briers, G. E. (2001). Handling nonresponse in social science research. *Journal of Agricultural Education, 42*(4), 43-53. doi: 10.5032/jae.2001.04043

MacEwen, K. E., & Barling, J. (1994). Daily consequences of work interference with family and family interference with work. *Work and Stress, 8*, 244–254.

Mesmer-Magnus, J. R., & Viswesvaran, C. (2005). Convergence between measures of work-to-family and family-to-work conflict: A meta-analytic examination. *Journal of Vocational Behavior*, *67*(2), 215-232.

Miller, L. E., & Smith, K. L. (1983). Handling non-response issues. *Journal of Extension, 21*(5), 45-50.

Miller, W. W., & Scheid, C. L. (1984). Problems of Beginning Teachers of Vocational Agriculture in Iowa. *Journal of the American Association of Teacher Educators in Agriculture*, *25*(4), 2-7. doi: 10.5032/jaatea.1984.04002

Moore, G. E., & Camp, W. G. (1979). Why vocational agriculture teachers leave the profession: A comparison of perceptions. *Journal of the American Association of Teacher Educators in Agriculture*, *20*(3), 11-18. doi:10.5032/jaatea.1979.03011

Morgan, D. H. (2014). Superdads: how fathers balance work and family in the twenty-first century. *Journal of Gender Studies*, *23*(2), 219-221.

Moyer, L. M., & Geissler, P. H. (1991). Accommodating outliers in wildlife surveys. *Wildlife Society Bulletin*, *19*(3), 267-270.

Mundt, J. P., & Connors, J. J. (1999). Problems and challenges associated with the first years of teaching agriculture: A framework for preservice and inservice education. *Journal of Agricultural Education*, *40*(1), 38-48. doi:10.5032/jae.1999.01038

Murray, K., Flowers, J., Croom, B., & Wilson, B. (2011). The agricultural teacher's struggle for balance between career and family. *Journal of Agricultural Education*, *52*(2), 107-117. doi: 10.5032/jae.2011.02107

National FFA Organization (2014). *FFA membership.* Retrieved from https://www.ffa.org/about/who-we-are/our-membership

Netemeyer, R. G., Boles, J. S. & McMurrian, R. (1996). Development and validation of work–family conflict and family–work conflict scales. *Journal of Applied Psychology, 81*, 400–410.

Newcomb, L. H., Betts, S. I., & Cano, J. (1987). Extent of burnout among teachers of vocational agriculture in Ohio. *Journal of the American Association of Teacher Educators in Agriculture*, *28*(1), 26-33. doi:10.5032/jaatea.1987.01026

Noor, N. M. (2004). Work-family conflict, work-and family-role salience, and women's well-being. *The Journal of Social Psychology*, *144*(4), 389-406.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York, NY: McGraw-Hill.

Ogungbamila, B. (2014). Work-Family Interference and Occupational Burnout among Employees in Service Occupations in Nigeria. *International Journal of Psychological Studies*, *6*(3), 71-79. doi: 10.5539/ijps.v6n3p71

Pleck, J. H. (1977). The work–family role system. *Social Problems, 24*, 417–442.

Sorensen, T. J. (2015). Sorensen, T. J. (2015). *Agriculture teachers' work and family domain characteristics, work-family conflict, and turnover intentions: A national study.* (Doctoral dissertation). Retrieved from http://hdl.handle.net/1957/55821

Sorensen, T. J., & McKim, A. J. (2014). Perceived work-life balance ability, job satisfaction, and professional commitment among agriculture teachers. *Journal of Agricultural Education*, *55*(4), 116-132. doi: 10.5032/jae.2014.04116

Torres, R. M., Lawver, R. G., & Lambert, M. D. (2009). Job-related stress among secondary agricultural education teachers: A comparison study. *Journal of Agricultural Education*, *50*(3), 100-111. doi**:** 10.5032/jae.2009.03100

Torres, R. M., Ulmer, J. D., & Aschenbrener, M. S. (2008). Workload distribution among agriculture teachers. *Journal of Agricultural Education*, *49*(2), 75. doi: 10.5032/jae.2008.02075

Vieira, J. M., Lopez, F. G., & Matos, P. M. (2013). Further Validation of Work–Family Conflict and Work–Family Enrichment Scales among Portuguese Working Parents. *Journal of Career Assessment*, 00(0), 1-16. doi: 0.1177/1069072713493987.

Westman, M., & Piotrkowski, C. S. (1999). Introduction to the special issue: Work–family research in occupational health psychology. *Journal of Occupational Health Psychology, 4*(4), 301-306. doi:10.1037/1076-8998.4.4.301

Extension Agents' Perceptions of a New Staffing Plan

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Abstract

County-level Extension agents play a vital role in fulfilling the Mississippi State University Extension Service's mission to provide research-based information, educational programs, and technology transfer focused on the issues and needs of Mississippi citizens. As the outreach arm of the organization, these agents provide the bridge between the Extension Service and those it serves. The way agents perform this function is determined on the state level through the Mississippi State University Extension Service staffing plan. The purpose of this study was to describe Extension agents' perceptions of the most recently instituted staffing plan and the subsequent changes in their responsibilities. Eight county-level Extension agents were purposively selected and interviewed to ascertain their thoughts and feelings about the new plan and their changing roles as agents. Overall, the agents accept and support the plan; however their perceptions of their job responsibilities differed resulting in inconsistencies in the way the counties function. Additional research should be conducted to determine how these inconsistences affect the Extension Service's ability to fulfill its mission.

Introduction/ Need for Study

In 2014, the Mississippi State University Extension Service celebrated the 100 year anniversary of the Smith-Lever Act which established cooperative extension work. It was a time to reflect upon the past, present, and future of the Mississippi Extension Service. Fluctuating markets, new technology, and public priorities have changed the environment in which Extension functions causing the organization to make critical decisions in order to remain relevant and effective (Schmitt & Bartholomay, 2009).

In preparation of the 100 year anniversary of Extension, the decision was made to develop a new staffing plan. In January 2013, a new staffing plan, affecting the roles of county-level Extension agents, was implemented. According to the plan, a Family and Consumer Science agent and an Agriculture and Natural Resource agent will occupy each county. They will then share 4-H and Community Resource Development responsibilities. The dual role of each Extension agent will replace the position of 4-H agent for many counties. (Counties with a youth population of 8,000 or more will continue to support a 4-H agent position.) In most situations this change means individuals are now responsible for duties which were not components of their original position.

Research priority six of the *National Research Agenda: American Association for Agricultural Education's Research Priority Areas for 2011-2015* (Doerfert, 2011) indicates "strong local communities have effective leaders and engaged citizens who ensure high quality educational and career development opportunities for youth and adults and proactively sustain an environment conducive to positive community change and growth" (p. 10). The Extension system is intended to extend the knowledge and expertise at Land-Grant Universities to the citizens of the state. As the outreach arm of the MSU Extension Service, it is important to understand in what way Extension agents perceive their job responsibilities and ultimately how it affects the fulfillment of the MSU Extension Service's mission.

Literature Review/Conceptual Framework

Change is not foreign to cooperative extension systems as they often face challenges, such as economic decline, with strategies of organizational change (Smith & Torppa, 2010). According to Jayaratne and Gamon (1998) management restructuring is a common change that can take place in a non-profit service organization like the Cooperative Extension Service and is "designed to increase the efficiency and effectiveness of the personnel resources through significant changes in organizational structure" (p. 45). Although organizational change, such as management restructuring, is intended for improvement, Smith and Torppa (2010) argue that continuous change can have negative effects on personnel.

Extension employees can suffer from change fatigue, apathy, and/or resistance to change which can inhibit the change from being accepted and implemented (Smith and Torppa, 2010). Similarly, Hutchins (1992) found that Extension agents' feelings toward an organizational change ranged from excitement to anxiety to apathy. Further, the anxiety just after reappointment can have a negative impact on job performance (Jayaratne & Gamon, 1998). Despite these potential barriers to change, state Extension systems remain as organizations of continuous transformation and subjects of numerous research studies.

Changes in organizational structure of state Extension systems have been the focus of multiple studies and strategies (Bartholomew & Smith, 1990; Huerta & Smith, 1994; Hutchins, 1992; Jayaratne & Gamon, 1998; Schmitt & Bartholomay, 2009; Torppa & Smith, 2009). One of the major studies in organizational change of Extension systems explores staffing patterns (Young & Cunningham, 1974).

In their comparison study of the state Extension staffing plans, Young and Cunningham (1974) identified Extension professionals' perceptions of the strengths and weaknesses of three different plans; two incorporated area agent responsibilities while the other was represented only by county agents supported by state specialists. The top five strengths of the county–agent– only staffing plan are as follows:

1. Provides for close contact with clientele.
2. Provides for close working relationship between county and specialist personnel.
3. Encourages clear lines of administrative and technical communication.
4. Allows flexibility and freedom to solve problems and plan programs that are applicable to the individual worker's organizational staffing position.
5. Allows an agent to concentrate in area of expertise (Young & Cunningham, 1974, p. 14).

The top four weaknesses of this staffing plan were as follows:

1. Results in too few county, multi-county, and state staff.
2. Allows for too great a geographical distance between specialist staff and clientele.
3. Is associated with a specialist staff lacking in field experience.

4. Makes it more difficult to establish clear lines of communication (Young & Cunningham, 1974, p. 14).

Perceived effectiveness of staffing plans has also been studied. Warner (1973) found that although not a significant difference, the difference in perceived effectiveness between staffing plans reveals that a county-agent-only staffing plan is less effective than staffing plans characterized by area agents. Warner (1973) also studied staffing patterns' effects on job satisfaction and perceptions of organizational complexity. He found significant differences which identified the county agent only pattern as the plan with the lowest level of job satisfaction and the highest level of complexity (Warner, 1973). It has been argued that area staffing demonstrates higher levels of satisfaction because of the mutual support and communication between area, county, and state staff and the increased opportunity for specialization. Professionals with area staffing are likely to view the organization as simpler because that staffing pattern can be viewed as a method of decentralizing authority among the different levels of the organization (Warner, 1973; Young & Cunningham, 1975).

Leavitt's organizational model (Figure 1) illustrates organizations as dynamic systems with four interdependent variables which may be the source of deliberate change (Radnor & Boaden, 2004). These components are *task*, *structure*, *technology* and *people* and may be described as follows:

Task refers to the production and delivery of goods and services (Warner, 1973). Task encompasses the actions completed to achieve the goals of the organization (Kraemmergaard, Lynge, & Schou, 2008). According to Craven and Mahling (1995), tasks can be viewed on a continuum ranging from "loosely-defined, unique processes to well-defined, repetitive processes" (p. 242). *Structure* refers to the systems of the organization including the systems of communication, authority, rewards, status and work flow (Webster & Wind, 1972). *Technology* refers to the tools or techniques used to execute tasks of the organization including both machines and programs (Kraemmergaard et al., 2008; Warner 1973). *People* refers to the actors of the organization including their expectations, attitudes, and skills (Krammergaard et al., 2008; Warner, 1973).

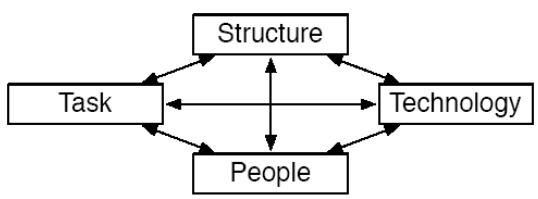

Figure 1. Leavitt's organizational change model (Kraemmergaard, Lynge, & Schou, 2008)

The connecting arrows in Figure 1 demonstrate the high interdependence of the variables. This interdependence makes each variable vulnerable to change as a result of a change in another variable whether the change is deliberate or not. Further, only optimizing one of the variables can lead to an imbalance in the organization (Radnor & Boaden, 2004).

Leavitt's organizational model has been used to explore organizational change. It can aid in explaining the effects of changing one or more of the variables (Keen, 1981), studying the facilitation or rejection of changes (Mandt, Horn, Ekedahl, & Granas, 2010), and assessing how change has been managed (Smith, Norton, & Ellis, 1992). It has also been used to diagnose organizational problems (Kraemmergaard et al, 2008), to determine an organization's health based upon the balance of the four variables (Radnor & Boaden, 2004), and to provide a structure for identifying the requirements for a shared task support environment (Craven & Mahling, 1995).

According to Warner (1973), changes in the staffing arrangements of organizations are predominantly of the structure component in this model. Therefore, this study uses the model to explore Mississippi Extension agents' perceptions of the deliberate structural change implemented though the new staffing plan. However, as other components are likely to be affected as well they should be considered when describing agents' perceptions. To demonstrate that additional variables may be affected as a result of manipulating one, the study will also focus on Extension agents' perceptions of the subsequent changes in their job responsibilities which encompass the people and task components.

Purpose and Objectives

The purpose of this study was to qualitatively investigate the perceptions of the new MSU Extension Service staffing plan and the resulting changes in responsibilities on the county level from the Extension agent's point of view.

The following research questions were used to guide the study:

> **RQ1:** What are the perceptions of Mississippi Extension Agents toward the new staffing plan?
>
> **RQ2:** What are the perceptions of Mississippi Extension Agents toward their new job responsibilities?

Methodology

Qualitative research methodologies were followed to investigate the research questions. The researcher consulted with an Extension professional at the university level in order to obtain a list of potential participants representing diverse backgrounds needed for maximum variation. Eight of thirty-three county-level Extension agents contacted accepted the invitation to participate in face-to-face and phone interviews based on the maximum variation strategy of purposive sampling. This type of sampling is used to provide "information-rich cases" from which to identify central themes or principals that transcend participant variation (Patton, 1990, p.169).

With over 95 years of combined service to the Mississippi Extension Service, the eight participants presented a wide range of experience. The longest period of employment for a single agent in the study was 31 years while the shortest term was one year. Three agents had one to five years' experience; two agents had five to 10 years' experience; and three agents had more than 20 years' experience. There were also two agents with 19 years combined experience from three other state Extension systems. Additionally, Extension agents in Mississippi can earn promotion from agent I to agent IV based upon a portfolio submission which is used to evaluate job performance. These participants represented agent levels I, II, and IV.

Furthermore, the participants had varying levels of responsibility based upon their county size and staffing pattern. The county populations of the agents in the study range from about 7,500 to more than 49,500. The majority of counties in this study have a population of more than 20,000. One agent reported having an Extension program associate dedicated to 4-H on staff. All four of the females were assigned FCS and 4-H responsibilities with three of the four also serving as county coordinators. The four males were assigned ANR and 4-H responsibilities with two of the four also serving as county coordinators. Due to understaffing at the time of the study, one of the male county coordinators had to fulfill FCS duties as well.

Prior to collecting data, approval for the use of human subjects was obtained from MSU's Institutional Review Board. Thirty-three Mississippi county-level Extension agents were invited to participate with a recruitment letter sent via email. Contacting the primary researcher to schedule an interview served as participants' voluntary, informed consent of participation. In accordance with IRB protocols, there were no further contacts with Extension agents who did not respond to the initial recruitment.

Four participants were interviewed face-to-face and four were interviewed via phone using semi-structured interview protocols. Semi-structured interviews allow the interviewer to modify the format or questions during the interview process as needed (Ary, Jacobs, & Sorenson, 2010). The interviews consisted of about ten questions regarding the staffing plan and agents' responsibilities. All of the interviews were audio recorded, and lasted approximately 45 minutes. The researcher also collected field notes during the interview process.

The digital recordings from the interviews were transcribed verbatim into Word documents. Participants were assigned unique pseudonyms to protect their identities when analyzing and reporting the information. Constant comparison coding was used to develop themes for the two research questions. Data were initially coded incident to incident, and then followed by focused coding. Focused codes are "more directed, selective, and conceptual" than incident-by-incident coding (Charmaz, 2006, p. 57). Comparisons were made within single interviews, between all interviews, and between two distinguished groups in the study: the agents who began employment at the initiation of the staffing plan and those who have more than five years' experience. Six themes emerged from the data and a brief summary report was created in order to conduct member checks with the participants. The researcher sent participants a copy of the summary via email and requested they respond with any questions, comments, or concerns they may have regarding the findings. There were no comments received from the participants.

Research rigor (trustworthiness) was established through credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). Credibility was accomplished by triangulating data, peer debriefing, and member checks. Efforts to ensure confirmability was made through the use of an audit trail and knowledge of potential researcher bias. Transferability of the data was accomplished through the use of thick descriptions and purposive sampling. Finally, dependability of the study was strengthened through the use of an audit trail.

Researcher bias
Qualitative researchers must be aware of potential biases (Lincoln & Guba, 1985) due to the "difficulty in using humans-as-instruments…Humans exhibit selective perception" (p. 108). While it is not possible to remove all biases, it is important to acknowledge them. Reflexivity encourages researchers to recognize one's own biases and to actively seek them out (Ary et al., 2010). Therefore, the following narrative informs readers about my background with the MSU Extension Service and explains my epistemological stance.

I grew up in rural Mississippi and took advantage of the opportunities offered by the local 4-H program for 10 years. However, our 4-H program did not become active until our county agent was replaced. As a 4-H member, the Extension Service's structure was confusing. I did not understand why some counties did not have 4-H and why the former agent was not expected to establish a program. My interest in the organizational structure increased as a MSU student during the implementation of the new staffing plan. My experience as an involved 4-H member working with various Extension personnel along with the experience from my particular county informs the reader of my strengths and shortcomings in conducting this study.

With any research study there are limitations which should be acknowledged. There were only eight participants in this study. Their individual thoughts and opinions may not be truly representative of the entire state. Also, the findings of this study relate to the specific staffing plan of a particular state's Extension system.

Findings

RQ1: What are the perceptions of Mississippi Extension Agents toward the new staffing plan?

The first research question yielded three themes: focus on the county, need for 4-H agent in each county, uncertain of county-level agent's input.

Theme 1: Focus on the county
Prior to January 2013, there were area agents headquartered in one county who were responsible for multiple counties. This required more traveling, and agents' time was divided between each county. Mrs. Jones said she believes the MSU Extension Service lost support from its client base with the area agent concept, and Mrs. Parks said she believes the concept could encourage favoritism for one county. One of the key changes implemented by the new staffing plan is the fixed presence of two Extension agents in each county. Extension agents in this study felt this was a positive change resulting from the staffing plan.

Overall, the participants said they believed the change would improve the visibility of the Extension Service in each county. Mr. Wells said he believes the local Extension office was meant to be seen as the "strong point" of the Extension Service. "I think that is what it was meant to be. I think that's how we gain respect and have some success is with the county offices being the focal point," he said.

Others agree that this focus can increase support for the Extension Service. Participants said they believed this visibility would enable agents to increase participation in existing programs and generate more programs specifically tailored to meet the needs of their county. "I think you'll reach more clientele. I think you'll have more programs, and I think you'll have programs that are directly for your county," Mrs. Smith said.

In addition to improving the marketing of programs, Mrs. Jones said she believes this plan will allow agents to strengthen relationships within the community including relationships with county stakeholders and other local organizations.

Theme 2: Need for 4-H agent in each county

Another significant change implemented by the staffing plan is the transformation of the 4-H agent position. Instead of having a 4-H agent in every county, the ANR and FCS agents share the responsibilities of conducting a 4-H program. The exceptions to this are counties that have a youth population of at least 8,000 or counties that finance the position themselves. Neither Mrs. Jones nor Mrs. Simpson were concerned about this shift of roles, however, other participants did express some dissatisfaction.

Mrs. Smith and Mr. Nelson said they would consider this to be a "drawback" and "negative side," respectively. Although Mrs. Smith said these new responsibilities are not a major drawback, she described how her attention is divided between her FCS responsibilities and other agents' 4-H activities. She said, ". . . sometimes you feel like maybe you should concentrate on you, but you've got to help." Mr. Nelson expressed a similar sentiment saying, "You have to do a little bit of everything instead of just focusing on one. If you've got multiple things to do, all of them are going to get a little bit of your concentration."

Mr. Hill was straight forward with his wish to have a 4-H agent in his county.

> 4-H is such a big part of Extension that regardless of your population every county should have somebody that either primarily does 4-H or has more of a responsibility in 4-H than just a split. When you are capable of having that third agent it's good, but when you don't have that third agent you know there needs to be somebody to really head up 4-H in every county.

Mr. Wells also described the need for a 4-H agent in every county. He said he does not feel that each discipline is being wholly represented with the new plan, and he cites this as one reason why he does not believe the staffing plan fully addresses the Extension Service's need for organizational change. Mr. Stewart's remarks were very similar: "I don't think there was a need to split it between two agents. I think one agent, one go-to person involved with 4-Hers in the county is probably a lot easier."

Furthermore, Mrs. Parks described her appreciation for her county's 4-H agent, especially as someone new to the Extension agent position.

> I'm really lucky to have a 4-H agent. If we didn't, I would have to do all the 4-H, as well as the Family and Consumer Science and being new to it that would probably be a little overwhelming so I'm glad we have her.

Theme 3: Uncertain of county-level agent's input

During the planning process of the staffing plan, a committee with county-level agent members was consulted. However, only two of the eight participants mentioned that county-level Extension agents could serve on a staffing plan committee to assist with the process. Despite their knowledge of the committee, Mr. Wells and Mrs. Smith were still uncertain of the influence of the county agents. Mrs. Smith was pleased that there was a committee, but she jokingly admitted, "Some of your ideas may get taken into consideration; some may just go out the door." Other agents explained their uncertainty as well. Mrs. Parks said she wonders how much influence agents had because she has noticed a lack of understanding of the plan and apathy toward the plan: "Nobody seems to understand it or even care so much, which makes me think they probably didn't have much to do with it." Mr. Nelson said even though he is not certain of how much influence agents had, he believes it was limited because of some of the negative comments he has heard about the new plan and a lack of county-level influence on more recent developments.

Mrs. Simpson, Mr. Hill, and Mrs. Jones were more confident in their belief that county-level influence was limited. Mrs. Simpson replied, "Little to none." Mr. Hill quickly replied, "Not enough." Lastly, Mrs. Jones said, "I can't say they didn't involve us to some aspect. . . Personally, I'm saying I think our input was limited."

RQ2: What are the perceptions of Mississippi Extension Agents toward their new job responsibilities?

The second research question yielded three themes: variable changes in responsibilities, need for guidance, and county cohesion.

Theme 1: Variable changes in responsibilities

Since the staffing plan created dual roles for the ANR and FCS agents, there was a possibility that agents would feel that their responsibilities changed. There was a range of responses, but most of the agents said they do not consider their roles to be very different because they assisted with other program areas before the staffing plan. Mr. Wells said:

> My personal responsibilities haven't changed that much. I'm still doing what I was doing. I still work with 4-Hers, I still work with agriculture, and I still work with [FCS]... So as far as my responsibilities go I don't know that they've change that much.

Mrs. Simpson said, "I'm the county coordinator and I have responsibilities in FCS, 4-H, and Community Development, which is the same thing." She emphasized that in her county, "you do what needs to be done" no matter what your job title is. Mrs. Simpson said:

> As far as having those titles, I've always done it anyway. . . Now I don't know how it works in other counties, but this county has always worked that way. Just it didn't really matter what your title was. It was more - do the job.

Similarly, Mrs. Smith said that she has assisted with other programs despite her specific job title. She said her responsibilities are only "a little bit different." She explained that she will no longer be focused on multiple counties. However, she clarified that she will actually still travel to other counties to hold programs. Mrs. Smith said, "I guess the difference is, it's on paper that we work one county, but program-wise we still do other counties."

Additionally, Mr. Jones said that although he has taken on more 4-H responsibilities he has been more affected by understaffing than the staffing plan itself. He said, "You know, my role hasn't changed that much because of the staffing plan, but it has changed because of my county situation, the unique situation I'm in at the moment without having an FCS or 4-H agent." Nonetheless, Mr. Jones said that he still believed his responsibilities would be about the same even if he had been in a county that was not understaffed. In contrast, Mrs. Jones said:

> My personal responsibilities have changed tremendously. . . Now that I have the FCS responsibilities and the 4-H responsibilities. I've got to implement programs and plan programs and partner with federal agencies that do work. So that programming piece is a big part of what I do now.

Theme 2: Need for guidance

Although agents can use each other as resources for ideas and constructive criticism, several agents' comments demonstrated a need for additional sources of information. Agents could benefit from one-on-one guidance to help them better understand and implement the new staffing plan. Mrs. Smith suggested that someone could "come around every two or three months" to offer assistance. Mr. Nelson said this could be particularly beneficial for counties that are not adapting to the staffing plan or working together as well: "You know counties that do have an issue with it. . . . Step in and give them a little bit more guidance on who needs to be doing what."

Some agents also need guidance for their everyday job responsibilities. Two of the new agents described struggling to identify job tasks on a daily basis. Mr. Nelson explained, "My only wish is that we have more direction as far as the one-on-one. Somebody can come in and say 'Hey you need to do this, this, and this'."

Experienced agents expressed a similar sentiment, especially in regards to program evaluation. One agent confided that mid-year evaluations are not being conducted in the area. "When we get evaluated we don't see that person but once a year so we don't really know, 'are we doing good?, are we doing bad?'." Mrs. Smith said, "I think we need more of the one-on-one contact because right now we are kind of on our own." Having a more personal evaluation, more often is Mrs. Simpson's wish, too. She said that she would like to discuss her program with someone who can help her make improvements in her county and serve as a liaison between surrounding counties.

Additionally, Mrs. Jones made a case for the need for guidance. As a drawback to the staffing plan, she said agents could become complacent now that they are only responsible for one county. She said, “It’s pretty easy to become complacent, especially when you don’t have anybody looking over your shoulder every day, and you pretty much have to be your own motivator.” Although an everyday monitor would be extreme, Mrs. Smith suggested visits every two to three months could prove beneficial for helping agents fulfill their responsibilities.

Theme 3: County cohesion

Of the eight participants, three were relatively new to the program having three or fewer years of experience as an Extension agent. Having included these individuals with less experience in accordance with maximum variation sampling, a unique theme emerged. Mr. Stewart, Mrs. Parks, and Mr. Nelson all specifically mentioned the importance of teamwork in their counties. They said they believe teamwork in the county office helps them fulfill their responsibilities. Mr. Stewart said, “. . . I think for this to work properly we have different titles, but we’re all pretty much going to have to work on the same page. . .” Mr. Nelson described working with a co-worker:

> We are kind of lucky because our county coordinator and I work together more than ‘Hey this is yours, this is mine kind of deal.’ Some counties argue who has to do the 4-H stuff. But I like doing 4-H. It’s not a struggle here cause we all work together to get it done.

Mrs. Parks also described how county cohesion can help individuals adapt to changes. “I think I’m blessed to be in a good office where no one [steps] on toes. I don’t think that even if they changed it dramatically tomorrow on all of us, I don’t think it would affect us so much.”

Conclusions

Despite having a staffing plan and prescribed job responsibilities, agents’ interpretations of their job responsibilities differed resulting in inconsistencies in the way counties function. Furthermore, agents view the conditions of the staffing plan as guidelines that can be adjusted to fit each county. Nonetheless, the majority of the agents interviewed accepted the plan and expressed support, favoring the one-county focus versus the area agent concept. Several agents said they believed this staffing plan would allow them to be more effective which contrasts findings from the study of Warner (1973) who found Extension professionals perceive it to be less effective. As in Young and Cunningham’s (1974) study, agents in this study agreed that two strengths of the staffing plan are that it would provide close contact with clientele and allow more flexibility and freedom to solve problems and plan programs. There were agents who agreed with some of the weaknesses of the staffing plan presented by Young and Cunningham (1974) as well.

Young and Cunningham (1974) identified insufficient staff numbers as a weakness of the county-agent-only staffing plan. Statements by participants in this study illustrated this weakness in the new Mississippi staffing plan as it decreased the number of Extension agents solely dedicated to 4-H. The agent who had a 4-H program associate in the county office was grateful for that benefit, and others expressed the desire to have a similar position in their counties. Another weakness posited by Young and Cunningham (1974) was reflected in this study as well. An agent explained that this plan makes it more difficult to establish clear lines of communication. Because agents will be sharing the 4-H responsibilities, participants, parents and volunteers may struggle with the difficulty of dealing with two agents instead of one. Communication may also be more difficult because the organizational structure has changed. Area agents are no longer a part of the chain of communication. Instead, clients are supposed to contact their county agent. The addition of 4-H responsibilities and the disruption in the communication chain are good examples of how agents' *tasks* have been changed due to the alteration of the *structure* organizational variable (Kraemmergaard et al., 2008).

According to Smith and Torppa (2010) including personnel in the strategic planning process for organizational change can increase their openness to the change in the plan, increase their motivation for making the change successful, and decrease pessimistic concerns that the plan may not work. Even though the agents' noted some drawbacks to the plan, there was no strong opposition to it and agents were optimistic that everything would be okay. The agents in this study did not serve on the planning committee, but they accepted the plan. Therefore, we can conclude that other factors have contributed to the agents' openness to the new staffing plan.

Extension agents' perceptions of the extent of change to their job responsibilities varied as they reported a range from no change to tremendous change. The first factor that contributes to this response is the fact that three agents began their employment around the time of implementation of the staffing plan. Another factor that may have contributed to this is agents' assistance with activities outside of their program areas prior to the implementation of the staffing plan. Multiple agents expressed the mindset of 'do what you have to do to get the job done no matter what your title is' as an approach to Extension work. Therefore, agents have gained experience working in other program areas for the benefit of the whole county. Hutchins (1992) found agents who perceived the organizational change as something they were already doing, with a new name, felt indifferent toward the change. Still, as a result of the staffing plan some of the agents' perceptions of their job responsibilities changed which represents the *people* component of Levitt's model (Kraemmergaard et al., 2008).

Findings from this study support Leavitt's organizational change model as they demonstrate that changes in the *structure* component of the organization can also affect the *people* and *task* components (Kraemmergaard et al., 2008). The new staffing plan is the source of organizational change, and it represents the *structure* component. Some of the agents' perceptions of their job responsibilities changed which represents an effect on the *people* component. The *task* component has also been influenced because agents will no longer serve clients with the help of area agents. The way they obtain and deliver goods, in this case-information, has changed.

Recommendations

Several recommendations for future research can be made from the findings of this study. Quantitative research should be conducted to investigate the inconsistencies in fulfillment of the new staffing plan among MSU Extension agents. Additionally, research should be done to study the effectiveness of the new plan and the correlation to job satisfaction. The findings could be compared to Warner's (1974) study which compares effectiveness and job satisfaction of different staffing patterns and Scott, Swortzel, and Taylor's (2005) study which examines job satisfaction of MSU Extension agents. In the study, it would be beneficial to closely consider county coordinators as they now hold substantially more responsibilities than with previous plans. It would also be important to identify the impact of shared 4-H and community development responsibilities on program participation. With the increase in job responsibilities due to the staffing plan, it is important to determine the effects on work-life balance for Extension agents. According to Ensle (2005), avoiding burnout by maintaining the work-life balance is essential for Extension personnel. Some states have lost staff due to heavy workloads and insufficient time with family (Ensle, 2005).

There are several recommendations for practice. First, the MSU Extension Service should establish a communication channel between the state and county levels that is specifically designed for providing feedback. If there was a platform for agents to provide feedback, state staff would be able to recognize when multiple agents were having the same problem. This could help state staff tailor training specifically for individuals who are facing challenges. Jayarante and Gamon (1990) supported developing an individually focused in-service training to help alleviate the effects of anxiety just after reappointment of the Extension agent.

Planning and reporting is important for evaluating programs and the Extension agent as well. It has not been addressed in the literature how agents sharing program area responsibilities will complete reports. If both of the Extension agents participate in holding a 4-H program activity, then which one should claim the event as their own? There is a need to develop an effective method of planning and reporting that answers this question and accommodates the dual roles of the agents.

The MSU Extension Service should consider increasing the number of employees in each office to accommodate the request for assistance with 4-H activities. Ritchie and Stitsworth (1987) have suggested incorporating paid paraprofessionals into the county 4-H staffing model to maintain quality 4-H programs in the face of downsizing. Paraprofessionals would work closely with both the Extension professionals and volunteers to fulfill responsibilities such as volunteer development, resource development, program visibility, and curriculum development (Ritchie & Sitsworth, 1987). Another alternative could be to establish a detailed, realistic guide to sharing 4-H responsibilities. Richard and Verma (1984) and Mortvedt (1977) discuss the importance of creating a unified view of 4-H tasks between Extension professionals, their volunteer leaders and paraprofessionals. This idea of a unified view can also be applied to the two-agent team in each county to develop an agreement of 4-H responsibilities that would improve the effectiveness of each agent.

Furthermore, the MSU Extension Service should consider hiring an individual to accommodate agents' request for county-level support. Several of the agents in this study expressed a need for one-on-one guidance for their day-to-day activities as well as in regards to implementing the new staffing plan. This individual would have a more personal connection with the counties and agents which he or she serves in order to offer the most beneficial advice and assistance. Additionally, this individual could assist with the implementation of more effective evaluations. Another approach could be to create support teams similar to the concept established by the Ohio

State University Extension Service in 1991 (Zoller & Safrit, 1999). According to Zoller and Safrit (1999), these support teams comprised of the agent's county chair, appropriate district subject matter specialist(s), and district director (who serves as an ex-officio member) provide guidance and direction to an agent by "helping plan and evaluate educational programs, assisting with the development of the yearly plan of work, observing agent teaching sessions, serving as professional role models for the agent, and providing feedback to the district director for performance appraisal purposes" (para. 1). These teams could meet the perceived need for guidance and evaluation.

As Extension agents strive to provide knowledge and services to their communities, internal and external pressures can create a need for organizational restructuring. Though a change can seem disruptive, it often offers the chance for improvement. It is essential that the MSU Extension Service continue to identify opportunities for change and pursue better ways to meet the needs of those it serves.

References

Ary, D., Jacobs, L.C., & Sorenson, C. (2010). *Introduction to research in education.* (8th ed.). Belmont, CA: Wadsworth

Bartholomew, M.H., & Smith, L.K. (1990). Stresses of multicounty agent positions. *Journal of Extension, 28.* Retrieved from http://www.joe.org/joe/1990winter/a2.php

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis.* Thousand Oaks, CA: Sage

Craven, N. & Mahling, D. (1995). Goals and processes: A task basis for projects and workflows. In N. Comstock & C. Ellis (Eds.), *COCS '95 Proceedings of conference on organizational computing systems:* (pp. 237-248). doi:10.1145/224019.224045

Doerfert, D. L. (Ed.) (2011). *National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015*. Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications.

Ensle, M. K. (2005). Burnout: How does extension balance job and family? *Journal of Extension, 43*(3). Retrieved from http://www.joe.org/joe/2005june/a5.php

Huerta, J., & Smith, K. (1994). Attitudes of county Extension agents toward specialization in Ohio. *Journal of Agricultural Education, 35*(3), 6-10.

Hutchins, G. (1992). Evaluating county clustering. *Journal of Extension,* 30(1). Retreived from http://www.joe.org/joe/1992spring/a5.php

Jayaratne, K., & Gamon, J. (1998). Effects of restructuring on the job performance of Extension educators: Implications for in-service training. *Journal of Agricultural Education,* 39(4). Retrieved from http://www.jae-online.org/attachments/article/492/39-04-45.pdf

Kraemmergaard, P., Lynge, B.C., & Schou, C.D. (2008). A review of IT service management and organizational changes. Paper presented at 5th International Conference on Enterprise Systems, Accounting and Logistics 2008, Heraklion, Crete Island, Greece. Retrieved from http://www.icesal.org/2008%20PROCEEDINGS/P/P6.pdf

Keen, P. (1981, January). Information systems and organizational change. *Communications of the ACM, 24*(1). Retrieved from http://delivery.acm.org/10.1145/360000/358543/p24-keen.pdf?ip=129.118.72.21&id=358543&acc=ACTIVE%20SERVICE&key=B63ACEF81C6334F5%2E97433694AFE6D246%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=619074464&CFTOKEN=23635909&__acm__=1421521390_c4b42808d318788390385453fc24055f doi: 10.1145/358527.358543

Lincoln, Y. S., & Guba, E. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.

Mandt, I., Horn, A.M., Ekedahl, A., & Granas, A.G. (2010). Community pharmacists' prescription intervention practices- Exploring variations in practice in Norwegian pharmacies. *Research in Social and Administrative Pharmacy, 6,* 6-17. doi: 10.1016/j.sapharm.2009.03.003

Mortvedt, M. (1977). Dilemma of change. *Journal of Extension, 15,* 7-11. Retrieved from www.joe.org/joe/1977november/77-6-a1.pdf

Patton, M. (1990). *Qualitative evaluation and research methods*. (pp. 169-186). Beverly Hills, CA: Sage. http://legacy.oise.utoronto.ca/research/field-entres/ross/c tl1014 /Patton 1990.pdf

Radnor, Z. J., & Boaden, R. (2004). Developing an understanding of corporate anorexia. *International Journal of Operations & Production Management, 24*(3), 424-440. Retrieved from http://search.proquest.com/docview/232356185?accountid=7098

Richard, R.F., & Verma, S. (1984). Sharing the 4-H job with leaders. *Journal of Extension, 22*(6). Retrieved from http://www.joe.org/joe/1984november/a4.php

Ritchie, R.M., & Stitsworth, M. H. (1987). Carving a niche. *Journal of Extension, 25.* Retrieved from http://www.joe.org/joe/1987fall/a3.php

Schmitt, A.M., & Bartholomay, T. (2009). Organizational restructuring and its effect on agricultural extension educator satisfaction and effectiveness. *Journal of Extension, 47.* Retrieved from http://www.joe.org/joe/2009april/rb1.php

Scott, M., Swortzel, K.A., Taylor, W.N. (2005). Extension agents' perceptions of fundamental job characteristics and their level of job satisfaction. *Journal of Southern Agricultural Education Research, 55* (1), 88-101. Retrieved from http://www.jsaer.org/pdf/Vol55/55-01-088.pdf

Smith, C., Norton, B., & Ellis, D. (1992). Leavitt's diamond and the flatter library: A case study in organizational change. *Library Management*, 13, 18-22. doi: 10.1108/01435129210020352

Smith, K.L., & Torppa C.B. (2010). Creating the capacity for organizational change: Personal participation and receptivity to change. *Journal of Extension, 48.* Retrieved from http://www.joe.org/joe/2010august/a1.php.

Torppa, B.C., & Smith, L.K. (2009). An examination of the impact of organizational restructuring on identification within extension. *Journal of Extension, 47.* Retrieved from http://www.joe.org/joe/2009december/rb1.php

Warner, P.D. (1973). A comparative study of three patterns of staffing within the cooperative extension service organization and their association with organizational structure, organizational effectiveness, job satisfaction, and role conflict (Doctoral dissertation, Ohio State University). Retrieved from https://etd.ohiolink.edu/ap/0?0:APPLICATION_PROCESS%3DDOWNLOAD_ETD_SUB_DOC_ACCNUM:::F1501_ID:osu1279045304%2Cinline

Webster, F.E., Wind, Y. (1972). A general model for understanding organizational buying behavior. *Journal of Marketing*, 36(2), 12-19. Retrieved from http://www.jstor.org/stable/1250972

Warner, P., Young, R., & Cunningham, C. (1975) Is area staffing better? *Journal of Extension.* Retrieved from http://www.joe.org/joe/1975may/75-3-a3.pdf

Young, R.E. & Cunningham, C.J. (1974). Area agent staffing compared with county-only staffing in the cooperative extension service in the United States. Retrieved from ERIC database. (ED109349)

Zoller, C., & Safrit, D.R. (1999). Ohio state university extension agents' perceptions of agent support teams. *Journal of Extension, 37.* Retrieved from http://www.joe.org/joe/1999february/rb4.php

Top Agricultural and Natural Resource Issues in Hawai‘i

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Issues surrounding agriculture and natural resources (ANR) are becoming more prevalent and each geographical location has a unique combination of ANR issues that must be addressed for system-wide, optimum efficiency. Populations are increasingly removed from the ANR industry; this has resulted in a knowledge gap between consumers and producers. Further, strains on natural resources have decreased the ANR industry’s ability to produce. Although technologies have lessened many stresses on producers, it has made ANR unfamiliar to many urbanites; the romanticized image of agriculture has become hazy. The purpose of this study was to identify the top agricultural and natural resource issues in Hawai‘i as perceived by industry professionals and suggest curricula and programming strategies for ANR educators to bridge the gap between consumers and producers. A modified Delphi method was used to carry out this study. A panel of ANR industry professionals (N=30) identified five ANR issues in Hawai‘i: (a) Public understanding of modern agriculture, (b) Water, (c) Technology in agriculture, (d) Agricultural land, and (e) Cost of production. In addition to the identification of the ANR issues in Hawai‘i, this study recommends educator collaborations with ANR industry professionals and systems-thinking integration into agricultural content.

Introduction

Issues surrounding agriculture and natural resources (ANR) are becoming more prevalent and each geographical location has a unique combination of ANR issues that must be addressed for system-wide, optimum efficiency and outputs. The ANR industry faces issues that affect production, efficiency, human dimensions, environment, markets, and more (Abi-Ghanem et al., 2013; Bruinsma, 2003; Pretty et al., 2010). These issues have been researched and data has been kept for many years and organizations, such as the World Health Organization (WHO), the Food and Agriculture Organization (FAO), and the Worldbank, project trends and impacts well into the future.

One such projection is in relation to the world population. According to the United Nations, Department of Economic and Social Affairs, Population Division (2013), the world population in mid-2013 was 7.2 billion and it is projected to reach 9.6 billion in 2050. Growing populations have greatly affected ANR issues in terms of production, land availability, and environmental impacts. For example, the number of emerging economies has increased. This will increase the demand for animal protein as a result of growing expendable incomes and desire to increase the nutritional qualities and general diversity of their diets (FAO, 2004; United States Department of Agriculture [USDA], 2013). Increased agricultural land is necessary to meet these needs but, in reality, there is less land available due to land acquisition for human habitation, business development, and environmental and natural resource preservation (FAO, 2004; Lambin & Meyfroidt, 2011; Rulli, Saviori, & D’Odorico, 2013; USDA, 2013; Weinzettel, Hertwich, Peters, Steen-Olson, & Galli, 2013; Yoo et al., 2013). Advances in agricultural technologies offer opportunity for more efficient production and natural resource protection (King, 2001; Lambin, 2012; Tilman, Cassman, Matson, Naylor, & Polansky, 2002), but these same advances have made agriculture unfamiliar to many consumers (King, 2001).

One of the effects of populations with increased spending capacity is urbanization. Increases in urbanization have an effect on the connection, or lack thereof, between consumers and producers (Sharp, Imerman, & Peters, 2002). The urban population is generally not familiar with modern agricultural practices and many have a romanticized view of agricultural practices (Sanford, 2011). Recent "buy local" movements have proven to be catalysts in rekindling this relationship (Coit, 2009; Sharp et al., 2002). Individuals have established a number of ways to learn about their food. Some have made it as simple as shopping at local farmers markets and using the time to talk with crop and animal producers, while others have financially committed themselves as shareholders in community-supported agriculture (CSA) or community food security (CFS) programs (Hamm & Bellows, 2003; Sharp et al., 2002).

Outside of these localized movements, the consumer-producer relationship is rare. Additionally, ANR issues are typically location/situation dependent, yet many of them have a great deal of interplay due to globalization (Bruinsma, 2003). People are moving globally in search of higher incomes, stable livelihood, education, or to begin new adventures. With this comes the relocation of goods, demand for goods, and political influence on countries that may or may not have been previously present (Baylis, Smith, & Owens, 2014; Eriksen, 2014). Globalization influences diets, cultural presence, biosecurity, the environment, and natural resources (Eriksen, 2014).

Population growth, urbanization, and globalization produce positive and negative influences on ANR and, therefore, considerations must be given to its intricacies. ANR is a system and as such, each element in the system either directly or indirectly affects another. Although difficult to quantify and qualify in many instances, natural resources have profound impacts on food production and also the general public. ANR issues provide opportunity for agricultural educators at all levels to engage with industry for content input and to provide their students with real-world problem solving situations.

Agricultural educators must be informed of the latest trends and issues to create relevant courses and programs for the learner with the end-goal of creating industry-prepared students and industry savvy communities. Albracht (1966) wrote that preparing students for careers by training them with industry-desired competencies has merit for students and educators. Further, industry has a desire for students, both formal and informal, to be educated with current information from industry (Ramsey & Edwards, 2011) and be critical thinkers, problem solvers, and articulate within their context (Scanlon, Bruening, & Cordero, 1996). Relationships with industry also allows opportunity for students to participate in high-impact educational practices (Kuh, 2008) during the course/program (e.g., learning community investigation of industry issues, research, etc.) or potentially afterward in the form of an internship. Agricultural education programs are tasked with developing students who are prepared for a career in the agricultural industry; this is supported by Priority 5-Efficient Effective Programs of the American Association for Agricultural Educator's National Research Agenda (Doerfert, 2011).

The College of Tropical Agriculture and Human Resources at the University of Hawaiʻi at Mānoa is in the process of creating a new program to address ANR issues in Hawaiʻi that is reflective of its transdisciplinary nature and of the competencies faculty and students will need to face current and trending issues in industry. This program will include traditional and extension education programming, industry leadership and communication training, understanding public perceptions of agriculture and agricultural issues, and providing this information to policy makers.

Conceptual Framework

The framework used for this study is the conceptual model for agricultural subject matter as a content and context for teaching (Roberts & Ball, 2009), specifically the focus on industry-validated agricultural curricula as an input into course curriculum and the facilitation of learning to create agriculturally literate citizens and a skilled workforce. Developing curricula and programs in ANR is highly context dependent (Roberts & Ball, 2009), interdisciplinary in nature (Bawden, 1991), and should be indicative of the current and trending competencies needed to be successful in industry (Albracht, 1966). Roberts and Ball (2009) address these factors by indicating the reciprocal nature of Knowledge across Domains and Industry-Validated Agricultural Curricula and their contributions to creating an Integrated Curricula. This model also "embraces the constructivist nature of learning" (p. 87) that occurs in the classroom as student-teacher interactions create a unique social environment. In the end, the authors show that learners produced from this model can be both Life Long Learners that are Agriculturally Literate Citizens and members of a Skilled Agricultural Workforce (see Figure 1).

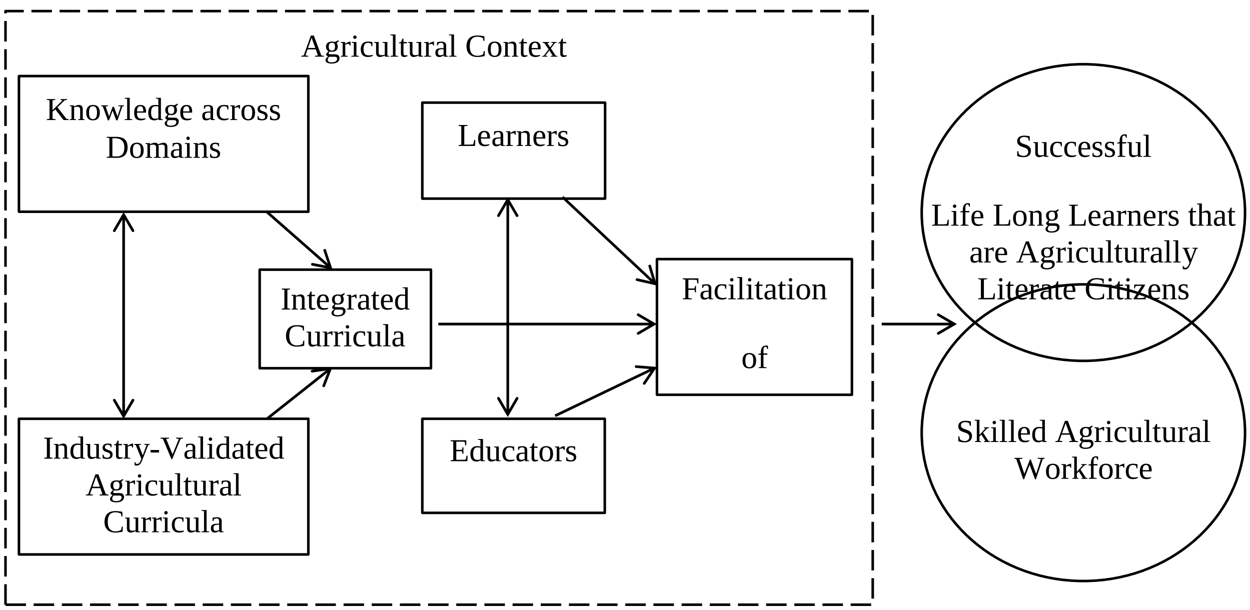

Figure 1. Conceptual model for agricultural subject matter as a content and context for teaching. Adapted from "Secondary Agricultural Science as Content and Context for Teaching," by R. G. Roberts and A. L. Ball, 2009, *Journal of Agricultural Education*, *50*, p. 87. Copyright 2009 by the *Journal of Agricultural Education*.

From a theoretical, agricultural education perspective, a measure of successful learning is "students with an observable set of skills that can be used for successful employment" (Roberts & Ball, 2009, p. 83). Additionally, the authors posit that agriculturally literate citizens are a result of teaching and learning that takes place in an "authentic, experiential environment" (p. 86) in the context of agricultural and science content areas. Kovar and Ball's (2013) synthesis of agricultural literacy research supported the importance of agricultural literacy. The authors found it is critical for agriculture industry success and that, although agricultural literacy programs were "successful in disseminating agricultural literacy … many populations are still agriculturally illiterate" (p. 175).

Purpose and Objectives

The purpose of this study is to identify the top agricultural and natural resource issues in Hawaiʻi as perceived by a panel of state-based industry professionals. The objectives that guided this study are as follows: (a) identify the top agricultural and natural resource issues in Hawaiʻi as perceived by industry professionals and (b) suggest curricula and programming strategies for ANR educators in the state of Hawaiʻi. This study will serve as a needs assessment component to develop relevant and timely materials (Boone, Safrit, & Jones, 2002; Diamond, 1998). This study is part of a larger project to gather baseline data to develop higher education curricula and community outreach programming in Hawaiʻi based on current and trending issues in agriculture and natural resources.

Methods

A modified Delphi method was used to carry out this study. A modified Delphi method allows the researcher to gain consensus on a topic from a panel of experts (Dalkey, 1969) and was indicated by Witkin and Altschuld (1995) as a means of data collection for needs assessments. The panel of experts (ANR industry professionals) was purposefully chosen from three general areas of professional agriculture in Hawaiʻi: (a) agricultural professionals (e.g., farmers/ranchers, government officials in agriculture, and leadership in commercial agricultural operations and agriculture support organizations); (b) faculty members in the College of Tropical Agriculture and Human Resources; and (c) extension agents. These areas were identified to gain wide, differentiated perspective into agricultural issues.

Gatekeepers identified potential experts in each area. The gatekeepers were members of each area that did not participate in the study. The researcher chose the potential participants from the lists provided by the gatekeepers to provide confidentiality to the participants. Dalkey (1969) found that error decreased (i.e., reliability of the group responses increased) as the number of people in a group increased; he indicated a group containing seven people to be the lower limit. Dalkey (1969) and Dalkey, Rourke, Lewis, and Snyder (1972) suggested 13 participants to achieve a reliability of 0.9. In an effort to create reliability from each of the three represented areas, a recruitment email was sent to a total of 54 experts (18 from each area). Thirty experts agreed to participate in the study (N=30). The panel was comprised of 12 representatives from the agricultural professional group, 11 from the faculty member group, and 7 from the extension agent group; there were 14 males and 16 females.

A number of the experts were concerned about potentially being identified as a participant in this study. To reduce nonresponse as a result of this concern and in addition to the confidentiality measures taken as part of the study design, no effort was made to identify expert responses by their associated area of professional agriculture membership. This is a limitation of this study in terms of being able to further test the data and make conclusions and recommendations based on expert area association.

Online instrumentation software was used to collect data in three rounds. An email containing a link to the instrument was sent to participants. Pre-notice and reminder emails were sent to participants in each round to increase participation (Dillman, Smyth, & Christian, 2009). The University of Hawai'i at Mānoa Institutional Review Board approved this study.

Round 1

The Round 1 instrument contained one open-ended prompt for participants: Please list the top agricultural and natural resource issues in Hawaiʻi (as few or as many as you feel should be considered). Twenty-one participants responded (70%) with total of 122 items. Procedures from the constant-comparative method were used to combine like ideas and delete duplicates (Glaser & Straus, 1967); the result was 25 items. A panel of two agricultural professionals with knowledge of the study and the topic, but not associated with the study, conducted an audit of the constant-comparative method results (Lincoln & Guba, 1985). One item was added as a result of the audit because the auditors felt one of the 25 items would better represent the suggestions as two items. A total of 26 items were put forward for Round 2.

Round 2

The 26 items from Round 1 were placed on a five-point summated scale (1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Neither Disagree nor Agree*; 4 = *Agree*; 5 = *Strongly Agree*). According to Scheele (1975), the Delphi method must consider the differing realities and assumptions of participants. Therefore, participants were given space to make comments and/or suggestions regarding the list of items. The link was sent to all 30 experts via email for response. Twenty-two (73.33%) participants responded. It was determined *a priori* that items with agreement of 75% or greater (responses of 4 or 5) would advance to Round 3. Nine items met this criterion. Participant comments and/or suggestions were taken into consideration and audited by the same panel of agricultural professionals in Round 1. A participant suggested one item be added that had not been previously considered. The auditors agreed with the relevance of the item and it was added to the list. Another participant suggested the combination of three items into one. All three of these items fell below the 75% level of agreement, therefore it did not affect the statistically found nine items, and each of them had a level of agreement (72.73%) that almost made the cut-off. The auditors found this suggestion to be sound and the suggested name was added. A total of 11 statements were put forward for Round 3.

Round 3

The 11 statements from Round 2 were placed on a seven-point summated scale (1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Slightly Disagree*; 4 = *Neither Disagree nor Agree*; 5 = *Slightly Agree*; 6 = *Agree*; 7 = *Strongly Agree*) to allow for more precise measurement of agreement levels. Participants were given space to make comments and/or suggestions regarding the list of items. The link was sent to all 30 experts via email for response. Twenty-two participants (73.33%) responded. It was determined *a priori* that a 75% or greater agreement (responses of 6 or 7) would be retained as industry professionals' indication of top agriculture and natural resource issues in Hawai'i.

Results

Rounds 1 and 2

In Round 1, an open-ended prompt was used to collect top issues in agriculture and natural resources in Hawai'i. The prompt read: Please list the top agricultural and natural resource issues in Hawai'i (as few or as many that you feel should be considered). After a review by a panel of experts, 26 unique items were identified (see Table 1).

In Round 2, 22 participants indicated their level of agreement with each of the items as a top issue in agriculture and natural resources in Hawai'i. Items with agreement greater than or equal to 75% were advanced to Round 3. Participants made two suggestions: (a) add in an item called Agricultural Marketing and (b) combine Conservation, Food sustainability, Species management, and Waste management into one item called Environmental impacts. The panel of experts reviewed the suggestions, agreed, and made these changes. Based on participant responses and suggestions, 13 items were eliminated, four items were combined, and one item was added. Eleven total statements advanced to Round 3.

Table 1

Delphi Study Round 2: Industry Professionals' Percent Agreement with Agriculture and Natural Resource Issues in Hawai'i

Item[a]	Strongly Agree or Agree %[b]
Public understanding of modern agriculture	95.45
Technology in agriculture	95.45
Agricultural land	90.91
Water	86.36
Cost of production	81.82
Local food production	81.82

Research and development funding	81.82
Biosecurity	77.27
Energy	77.27
Agricultural labor	72.73
Conservation	72.73
Food sustainability	72.73
Regulation	72.73
Species management	72.73
Waste management	72.73
Native ecosystem protection	68.18
Food security	63.64
International competition	63.64
Biodiversity	54.55
Outdated agricultural terms/conceptualizations	54.55
Population growth	54.55
Climate change	52.34
Agricultural university/college dysfunction	50.00
Animal agriculture	40.91
Preservation of recreation areas	40.91
Overvalue of agriculture in Hawai‘i	9.52

Note. N=22. [a]Items were generated in Round 1 of the Delphi process. [b]Percentages were calculated from the Round 2 responses.

Round 3

In Round 3, 22 participants indicated their level of agreement with the 11 statements put forward from Round 2. The statements in Round 3 were Agricultural land, Agricultural marketing, Biosecurity, Cost of production, Energy, Environmental impacts, Local food production, Public understanding of modern agriculture, Research and development funding, Technology in agriculture, and Water. Items with agreement greater than or equal to 75% were retained; six items were eliminated in this round. Five items were found to be industry professionals' indication of top agriculture and natural resource issues in Hawai‘i: (a) Public understanding of modern agriculture, (b) Water, (c) Technology in agriculture, (d) Agricultural land, and (e) Cost of production (see Table 2).

Table 2

Delphi Study Round 3: Industry Professionals' Percent Agreement with Agriculture and Natural Resource Issues in Hawai'i

Item[a]	Strongly Agree or Agree %[b]
Public understanding of modern agriculture	90.91[d]
Water	90.91[d]
Technology in agriculture	86.36[d]
Agricultural land	81.82[d]
Cost of production	81.82[d]
Biosecurity	72.73
Energy	72.73
Research and development funding	68.18
Environmental impacts[c]	63.64
Local food production	54.55
Agricultural marketing	40.91

Note. N=22. [a]Items were generated in Round 2 of the Delphi process. [b]Percentages were calculated from the Round 3 responses. [c]A new item included as a result of participant suggestions in Round 2. [d]Items were found to be industry professionals' indication of top agriculture and natural resource issues in Hawai'i (items with agreement greater than or equal to 75%).

It should be noted that there was no effort made to rank these items in order of importance or urgency. To better understand the top ANR issues in Hawai'i, Table 3 shows examples of individual items from the original list of 122 that were consolidated to create each of the issues. It should also be noted that although a number of items did not advance to Round 2 or 3 and ultimately show at or above an agreement level of 75%, this is not an indication that they are not an ANR issue in Hawai'i; they should be considered as factors in relevant discussions.

Table 3

Individual Issue Identification of the Top Agriculture and Natural Resource Issues in Hawai‘i

Top ANR Issue	Individual Issues
Public understanding of modern agriculture	Animal rights vs. Animal welfare
	Communication
	Community knowledge of ANR practices and challenges
	Poor scientific literacy
	Promotion of diets that lead to nutritional deficiencies
	Understanding of regulation jurisdiction and implementation
Water	Affordability
	ANR effects on water (runoff/chemicals)
	Infrastructure/ Access to reliable sources of water (ANR use)
	Irrigation system restoration and maintenance
	Quality
	Water availability (surface and well)
	Watershed protection
Technology in agriculture	Biosecurity efforts
	Compliance with expanding federal regulations
	Innovative food and natural product development
	Modern technologies (biotechnology, pesticides, etc.)
	Research and development funding
	Small farmers access to technologies (equipment, inputs, etc.)

Agricultural land	Access to ANR land
	Affordability (especially for new ANR professionals)
	Infrastructure (inefficient, aged, or non-existent)
	Land use planning/management (conservation, production, and conversion; abandoned/fallow lands; land degradation under intensive cultivation)
	Tenure
Cost of production	Access to farm loans/assistance options for short-term leases
	Transportation
	Inputs
	Labor challenges (costs and logistics surrounding migrant labor)
	Workforce development

Note. This list is not inclusive of all statements. Its intent is to give a better idea of the types of statements that were combined to form each of the top issues. Individual issues are listed in alphabetical order.

Discussion

Regarding objective one, 30 ANR industry professionals representing agricultural professionals, faculty members in the College of Tropical Agriculture and Human Resources, and extension agents participated in a Delphi study to find the top ANR issues in Hawaiʻi; the professionals agreed with five issues at levels of 75% agreement or greater: (a) Public understanding of modern agriculture, (b) water, (c) technology in agriculture, (d) agricultural land, and (e) cost of production.

Agricultural professionals in Hawaiʻi found public understanding of modern agriculture to be a top issue. According to Sanford (2011), agriculture has greatly changed over time, yet the views that the current population holds about agriculture have not. This study supports this ideal. As the technologies, techniques, and sciences of agriculture developed (King, 2001; Tilman et al., 2002), the general population moved away from agriculture as a result of urbanization. The distance placed between the public and agriculture was both physical and knowledge based (Coit, 2009; Sharp et al., 2002). Additionally, Hawaiʻi has a very diverse population with strong local culture and traditions. Many in the population do not wish to deviate from the traditional cultural practices in ANR or from their romanticized ideals of agriculture (Sanford, 2011). Although there is a relationship gap between the consumer and the producer, there is great opportunity in Hawaiʻi agriculture. Farmers markets and CSA-type programs are popular with the local populations. In accordance with Hamm and Bellows (2003) and Sharp et al. (2002), producers and consumers in Hawaiʻi could come together over CSA or CFS programs. Consumers' interest in their food source is growing and these programs could enhance the conversation about food, consumer concerns, and industry concerns.

Water is a central element to life and given that agriculture is considered to be one of the largest consumers of water (Perry, 2011), it is central to ANR issues. The ANR industry in Hawaiʻi was found to be concerned about water issues, especially in regard to the access to, the cost of, and the protection of agricultural water. Access to, the quality, and the cost of agricultural water can be a limiting factor in agricultural production (Lambin, 2012). Even though more efficient water management techniques—rainfall harvesting, water storage, and irrigation methods—can reduce water use, reduce the amount of money spent on water, and increase overall water quality (Lambin, 2012; Zhang & Cai, 2011), other industries also affect water issues.

Water is a critical component in the tourist industry in terms of basic human needs, perceived value (e.g., landscaping), and activities (e.g., swimming, golf, skiing). This type of water use can contribute to water source and quality degradation and to the detriment of marine-based animal proteins and plant life, especially in coastal regions (Gossling et al., 2012). Overall, the mitigation of these water issues could help to "maintain current levels of available arable land" (Zhang & Cai, 2011, p. 7). Water issues in Hawaiʻi provide a unique opportunity for ANR industry, education, and tourist interaction.

Technologies in ANR were much different when urbanization became prevalent and people left the farm and rural areas. Although still laborious, technological advancements in implements, practices, and sciences (King, 2001) have made ANR more complex, yet efficient. Scientists contributed to this advancement by introducing more effective and efficient pesticides, fertilizers, crop species, animal medications, application methods, machines, and more (Tilman et al., 2002). Experts in Hawaiʻi's ANR industry found technological issues in Hawaiʻi to include the development and use of biotechnology, the creation/implementation of innovative processes and products, and the general progress of the ANR industry. Although these technologies provide opportunities for increased yields, decreased inputs, and overall natural resource protection (King, 2001; Tilman et al., 2002), the climate in Hawaiʻi does not always allow for adoption. Environmentally, Hawaiʻi is unique in terms of terrain, transportation, and other factors that influence the ANR industry, and it is highly regulated in terms of ANR imports and exports. The cultural environment can also play a role in the adoption of new processes and technologies; see the discussion on public understanding of modern agriculture.

Because the ANR industry has embraced these technological advancements to decrease inputs and increase outputs, ANR does not look familiar to the romanticized ideals of many urban natives (Sanford, 2011). Further, controversies (e.g., social, religious, and philosophical) that surround some of these technologies, such as application techniques, agricultural biotechnology, etc., have emotionally charged populations. Activist movements, anti-big agriculture movements, and bans on seed and food with biotechnology are just a few examples of the global population's reaction to modern agricultural technologies.

Land issues that were expressed by ANR industry professionals in Hawaiʻi included availability, human encroachment (general urban/rural interface), tenure, cost, and more. These findings align with researches findings that land used for ANR purposes is becoming scarce and access to natural resources, such as water, is driving land use and price issues (Lambin & Meyfroidt, 2011; Yoo et al., 2013). Reasons for land scarcity can be attributed to "human demand for biologically productive land and ocean area…increased demand for bioenergy and biomaterials…and desertification or encroaching human settlements" (Weinzettel et al., 2013, p. 433). There has also been an increase in governments and corporations acquiring foreign farmland to gain access to natural resources (Rulli et al., 2013). Hawai‘i has a large amount of land held by the government and private corporations/individuals/trusts. Although this can serve as natural resource protection (Rulli et al., 2013), it drives the price of available ANR land and, in some cases, the way in which land can be used in surrounding areas (Lambin & Meyfroidt, 2011; Yoo et al., 2013). With natural resources and land availability as limiting factors to ANR success, industry can expect their costs to rise. Fortunately, advances in technology have the potential to help increase efficiencies and decrease costs (Lambin, 2012).

Cost of production was also found to be an issue for the ANR industry in Hawai‘i. This issue includes topics such as inputs, transportation, land, water, labor, energy, etc. and is obviously interlaced with the issues described above. The costs to access quality water and to purchase arable land are increasing (Lambin & Meyfroidt, 2011; Yoo et al., 2013) and many of the technological inputs (e.g., machines, inputs), especially when the individual is new to the industry, can be extremely expensive. But, as written by King (2001) and Tilman et al. (2002), technologies are investments, and the financial and environmental returns on such investments come in time.

Recommendations

Objective two of this study was to suggest curricula and programming strategies for ANR educators in the state of Hawai‘i based on the found ANR issues by industry experts. Industry input into agricultural education curricula is in alignment with conceptual model for agricultural subject matter as content and context for teaching (Roberts & Ball, 2009). The findings and recommendations of this study also serve dual purpose as statements of need, which are the first step in the creation of potential lessons, courses, and/or programs (Diamond, 1998; Boone et al., 2002), as this program is in its infancy. Purposeful integration of these industry-validated ANR issues into agricultural curricula at secondary, higher, and adult education levels will develop a workforce that is prepared for the ANR industry in Hawai‘i and that are agriculturally literate (Albracht, 1966; Roberts & Ball, 2009).

ANR educators in Hawai'i should collaborate with local ANR industry professionals (e.g., extension agents, university faculty, farmers/ranchers, ANR support organizations, etc.) to create content that is relevant and timely. Industry collaborations can provide sources of guest speakers, content advisors, and also lead to high-impact learning opportunities, as defined by Kuh (2008), for students and educators. Further, these collaborations can continually inform content updates and revisions; industry desires students of all ages to be educated with current, industry-based information (Ramsey & Edwards, 2011).

Round 1 of this study elicited 122 total items in response to the prompt: Please list the top agricultural and natural resource issues in Hawai‘i (as few or as many that you feel should be considered). Although this was part of the methods process, in combination with the conceptual model set forth by Roberts and Ball (2009), it is noteworthy to point to the diversity of perception and individual context in regards to the issues in the ANR industry. ANR educators in Hawai‘i should consider a systems-thinking approach to ANR issues education as the industry is highly diversified in content and context. Bawden (1991) wrote, “The complexity, dynamics, and even chaos of contemporary agriculture deserves to be treated as such” (p. 2371). The transdisciplinary nature of ANR is easily made into a systems-thinking educational format. Students that are a product of this type of thinking and education are highly desirable in ANR industry (Scanlon et al., 1996) because they are better able to extrapolate information, articulate their position and understand other positions, think critically, solve problems, and work well in collaborative situations (Bawden, 1991).

References

Abi-Ghanem, R., Carpenter-Boggs, L., Koenig, R. T., Ullman, J. L., Murphy, K. M., & Pannkuk, C. (2013). Access to agricultural inputs, technology and information, communicating with farmers, and the role of women in agriculture: Perceptions of Iraqi extension agents. *Journal of International Agriculture and Extension Education*, *20*(1), 6-18. *doi*: *10.5191 /jiaee.2013.20101*

Albracht, J. J. (1966). “Industry function” approach to vocational education curriculum development. *Journal of the American Association of Teacher Educators in Agriculture, 7*(2), 11-14. doi: 10.5032/jaatea.1966.02011

Bawden, R. J. (1991). Systems thinking in agriculture. *Journal of Dairy Science, 74*(7), 2362-2373. Retrieved from http://www.journalofdairyscience.org/article/S0022-0302(91)78410 -5/pdf

Baylis, J., Smith, S., & Owens, P. (2014). *The globalization of world politics: An introduction to international relations* (6th ed.). Great Clarendon Street, Oxford: Oxford University Press.

Boone, E. J., Safrit, R. D., & Jones, J. (2002). *Developing programs in adult education: A conceptual programming model* (2nd ed.). Long Grove, IL: Waveland Press, Inc.

Bruinsma, J. (Ed.). (2003). *World agriculture: Towards 2015/2030. An FAO perspective*. Sterling, VA: Earthscan Publications Ltd.

Coit, M. (2009). Jumping on the next bandwagon: An overview of the policy and legal aspects of the local food movement. *The National Agricultural Law Center*. Retrieved from http://nationalaglawcenter.org/assets/articles/coit_bandwagon.pdf

Dalkey, N. C. (1969). *The Delphi method: An experimental study of group opinion.* Santa Monica, CA: The Rand Corporation.

Dalkey, N. C., Rourke, D. L., Lewis, R., & Snyder, D. (1972). *Studies in the quality of life: Delphi and decision-making*. Lexington, MA: Lexington Books.

Diamond, R. M. (1998). *Designing and assessing courses and curricula: A practical guide* (2nd ed.). San Francisco, CA: Jossey-Bass, Inc.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2009). *Internet, mail, and mixed-mode surveys: The tailored design method* (3rd ed.). Hoboken, NJ: John Wiley & Sons, Inc.

Doerfert, D. L. (Ed.) (2011). *National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015*. Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications.

Eriksen, T. H. (2014). *Globalization: The key concepts* (2nd ed.). New York, NY: Bloomsbury Academic.

Food and Agriculture Organization. (2004). Protein sources for the animal feed industry. Workshop presented at the. *Proceedings of the FAO Animal Production and Health Expert Consultation and Workshop*, Bangkok, Thailand. Retrieved from ftp://ftp.fao.org/docrep/fao/007/y5019e/y5019e00.pdf

Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory*. Chicago, IL: Aldine.

Gossling, S., Peeters, P., Hall, C. M., Ceron, J. P., Dubois, G., Lehman, L. V., & Scott, D. (2012). Tourism and water use: Supply, demand, and security. An international review. *Tourism Management, 33*, 1-15. doi: 10.1016/j.tourman.2011.03.015

Hamm, M. W., & Bellows, A. C. (2003). Community food security and nutrition educators. *Journal of Nutrition Education and Behavior, 35*(1), 37-43.

King, J. L. (2001). *Concentration and technology in agricultural input industries* (Agricultual Information Bulletin No. 763). Retrieved from United States Department of Agriculture, Economic Research Service website: http://libertyparkusafd.org/lp/NatureFirst%20USA/food%20industry%5CConcentration%20and%20Technology%20in%20Agricultural%20Input%20Industries.pdf

Kovar, K. A., & Ball, A. L. (2013). Two decades of agricultural literacy research: A synthesis of the literature. *Journal of Agricultural Education*, *54*(1), 167-178. doi: 10.5032/jae.2013.01167

Kuh, G. D. (2008). High-impact educational practices: What they are, who has access to them, and why they matter. *Association of American Colleges and Universities.* Retrieved from http://www.neasc.org/downloads/aacu_high_impact_2008_final.pdf

Lambin, E. F., & Meyfroidt, P. (2011). Global land use change, economic globalization, and the looming land scarcity. *PNAS, 108*(9), 3465-3472. doi: 10.1073/pnas.1100480108

Lambin, E. F. (2012). Global land availability: Malthus versus Ricardo. *Global Food Security, 1*, 83-87. doi: 10.1016/j.gfs.2012.11.002

Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications, Inc.

Perry, C. (2011). Accounting for water use: Terminology and implication for saving water and increasing production. *Agricultural Water Management, 98*, 1840-1846. doi: 10.1016/j.agwat.2010.10.002

Pretty, J., Sutherland, W. J., Ashby, J., Auburn, J., Baulcombe, D., Bell, M.,… Pilgrim, S. (2010). The top 100 questions of importance to the future of global agriculture. *International Journal of Agricultural Sustainability, 8*(4), 219-236. doi: 10.3763/ijas.2010.0534

Ramsey, J. W., & Edwards, M. C. (2011). Entry-level technical skills that agricultural industry experts expected students to learn through their supervised agricultural experiences: A modified Delphi study. *Journal of Agricultural Education, 52*(2), 82-94. doi: 10.5032/jae.2011.02082

Roberts, T. G., & Ball, A. L. (2009). Secondary agricultural science as content and context for teaching. *Journal of Agricultural Education, 50*(1), 81-91. doi: 10.5032/jae.2009.01081

Rulli, M. C., Saviori, A., D'Odorico, P. (2013). Global land and water grabbing. *PNAS, 110*(3), 892-897. doi: 10.1073/pnas.1213163110

Sanford, A. W. (2011). Ethics, narrative, and agriculture: Transforming agricultural practice through ecological imagination. *Journal of Agricultural and Environmental Ethics, 24*(3), 283-303. doi: 10.1007/s10806-010-9246-6

Scanlon, D. C., Bruening, T. H., & Cordero, A. (1996). An industry perspective on changes needed in agricultural education curricula. *Journal of Agricultural Education, 37*(2), 17-23. doi: 10.5032/jae.1996.02017

Scheele, D. S. (1975). Reality construction as a product of Delphi interaction. In H. A. Linstone & M. Turoff (Eds.), *The Delphi method: Techniques and applications* (pp. 37-71). Reading, MA: Addison-Wesley Publishing Company, Inc.

Sharp, J., Imerman, E., & Peters, G. (2002). Community supported agriculture (CSA): Building community among farmers and non-farmers. *Journal of Extension, 40*(3). Retrieved from http://www.joe.org/joe/2002june/a3.php

Tilman, D., Cassman, K. G., Matson, P. A., Naylor, R., & Polansky, S. (2002). Agricultural sustainability and intensive production practices. *Nature, 418*, 671-677. doi: 10.103/nature01014

United Nations, Department of Economic and Social Affairs, Population Division. (2013). *World population prospects: The 2012 revision, key findings and advance tables* (Working Paper No. ESA/P/WP.227). Retrieved from http://esa.un.org/unpd/wpp/Documentation/pdf/WPP2012_%20KEY%20FINDINGS.pdf

United States Department of Agriculture (2013). *USDA Agricultural Projections to 2022* (Long-term Projections Report OCE-2013-1). Retrieved from http://www.ers.usda.gov/media/1013562/oce131.pdf

Weinzettel, J., Hertwich, E. G., Peters, G. P., Steen-Olsen, K., & Galli, A. (2013). Affluence drives the global displacement of land use. *Global Environmental Change, 23*, 433-438. doi: 10.1016/j.gloenvch.2012.12.010

Witkin, B. R., & Altschuld, J. W. (1995). *Planning and conducting needs assessments: A practical guide*. Thousand Oaks, CA: Sage Publications, Inc.

Yoo, J., Simonit, S., Conners, J. P., Maliszewski, P. J., Kinzig, A. P., & Perrings, C. (2013). The value of agricultural water rights in agricultural properties in the path of development. *Ecological Economics, 91*, 57-68. doi: 10.1016/j.ecolecon.2013.03.024

Zhang, X., & Cai, X. (2011). Climate change impacts on global agricultural land availability. *Environmental research Letters, 6*, 1-8. doi: 10.1088/1748-9326/6/1/014014

Seeing What They See: A Photovoice Analysis of Exploratory Early Field Experiences

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Abstract

The purpose of this photovoice study was to investigate what and how preservice teachers conceive and make meaning of exploration observations of EFEs. EFEs are vital components of the teacher preparation program and include all activities that occur in preservice teacher education prior to student teaching, including exploratory observations (Retallick & Miller, 2010). Process coding of 123 photographs and reflective captions led to five themes: (a) maximizing student aperture, (b) affirming the decision to teach, (c) identifying learning strategy outcomes, (d) balancing the three circles of agricultural education, and (e) creating a felt need to learn. Praxis included more purposeful inclusion of cooperating teachers as experts, distinguishing between an experience and observation, and seeking those observations outside of agricultural education classrooms.

Introduction and Review of Literature

Questions about the impact teacher education programs have on preparing aspiring teachers effectively for employment has been called into question (Darling-Hammond, Chung, & Frelow, 2002). One way teacher educators prepare students for teaching roles is through early field based experiences (EFEs). EFEs are vital components of teacher preparation programs and include all activities that occur in preservice teacher education prior to the student teaching internship (Guyton & Byrd, 2000; Hulling, 1998; Retallick & Miller, 2007a; Smalley & Retallick, 2012). EFEs help preservice teachers develop their perceptions of teaching by considering “how situations within classrooms are experienced; how these situations are interpreted given the teacher’s previous experiences, beliefs, and assumptions; and how these interpretations are manifested in behavior” (Goodman, 1988, p. 121).

The purposes of EFEs are multifaceted. They exist to help future educators by decreasing their anxiety toward entering the teaching profession, increasing their desire to select a career in teaching, developing their self-efficacy to teach effectively, familiarizing them to the nuances of teaching, and exposing them to how students learn (Scherer, 1979). Perhaps the greatest attribute of EFEs, however, is that they provide preservice teachers the opportunity to explore a career in teaching as they observe the activities of a practicing teacher (Retallick & Miller, 2007b; Smalley & Retallick, 2012). Thus, EFEs are excellent avenues for assisting students in forming their teaching philosophies (Goodman, 1988).

McIntyre (1983) noted that EFEs are “probably the most praised, most criticized, most entrenched, most debated but certainly least understood part of preservice teacher education” (p. 1). Although recognized as a vital component to teacher education (Guyton & Byrd, 2000), a paucity of research exists on how preservice teachers conceive the experiences and make meaning of the teaching profession as a result of participating in multiple EFEs (Goodman, 1983). For conceptualization to occur for preservice teachers, personal schemas must be developed within each individual person (Korthagen & Kessel, 1999; Santrock, 2004).

> Teacher development is conceptualized as an ongoing process of experiencing practical teaching and learning situations, reflecting on them under the guidance of an expert, and developing one's own insights into teaching through the interaction between personal reflection and theoretical notions offered by an expert. (Korthagen & Kessels, 1999, p. 5)

As people's schemata begin to take shape, mental models are formed (Wideen, Mayer-Smith, & Moon, 1998). Developing mental models allows individuals to process their learning and begin to visualize themselves in the role of a teacher (Martin, 2008). Minogue (2010) stated that effort should be devoted to analyzing the mental models that preservice teachers bring to the teacher education program and how those images shape their personal and professional identity. Creating mental images helps preservice teachers consider how their perceived feelings, experiences, ideals, and perceptions of effective teaching align with what they *see* and experience in real classroom settings (Korthagen & Kessels, 1999).

Great variability exists from one institution to the next regarding the expectation of EFEs as well as how they are conducted and assessed (Guyton & Byrd, 2000). At a minimum, for EFEs to be effective, they should contain a clear purpose and set of activities that are documented through various forums devoted to establishing their purpose (Smalley & Retallick, 2010). Unfortunately, too often, EFEs have been resigned to students performing menial tasks, such as grading papers and managing students in classrooms, which does not allow aspiring teachers to focus on how to teach and connect it to how students learn (Moore, 2003; Retallick & Miller, 2007b). In their model for early career field experiences in teacher education, Retallick and Miller (2010) suggested that preservice teachers should be afforded opportunities to explore their careers through activities such as carefully guided observations. However, what do preservice teachers perceive and learn during various EFE experiences? How do their perceptions *fit* into their existing mental models? A need exists to study the "insights, messages, inferences, [and] reinforced beliefs about being a teacher, about pupils, classrooms, and the activities of teaching" (Feiman-Nemser & Buchman, 1983, p. 2) from the lens of preservice teachers.

Purpose of the Study

The purpose of this study was to investigate what and how preservice teachers conceive and make meaning of exploration observations of EFEs. The goal of this study was to expose preservice agricultural educators to various situations in which their knowledge and decision-making mechanisms (i.e., mental models) might be enriched and challenged (Moore, 2003).

Methods

Schmidt (2010) stated that "Contextualized studies of factors that individually or in combination contribute to the educative value of particular teaching experiences provide a large area for continued research. Qualitative studies are particularly well suited to uncovering such uniquely contextualized relationships" (p. 143). One such method that includes qualitative data regarding teaching experiences is photovoice. Photovoice is a method that uses "photos as a tool to collect data" (Borron, n.d., p. 7). The research strategy allows people to tell their stories through photographic images (Wang, 1999; Wang, Yi, Tao, & Carovano, 1998). The use of photographs can "invoke comments, memory and discussion" (Banks, 2007, p. 65). "It entrusts cameras into the hands of people to enable them to act as recorders, and potential catalysts for change, in their own communities" (Wang & Burris, 1997, p. 369). Photovoice can empower people to view the world differently and begin to think about making necessary changes to their environments (Strack, Magill, & McDonagh, 2004). Goodhart, Hsu, Baek, Coleman, Maresca, and Miller (2006) stated,

> Photovoice is a unique way to engage undergraduate students because the process fits into their busy lives. Taking pictures as part of a class experience is a spontaneous and accurate way to capture a moment, compared with writing a paper or having group discussions with no evidence present to back up people's opinions. (pp. 55-56)

Originally, photovoice was developed as a means to help the marginalized and oppressed, as photos told important stories about peoples' situations and served as images that helped shape policy (Wang, 1999). Photovoice has been used in various settings regarding social change. It "facilitates the sampling of different social and behavioral settings. People with cameras can record settings–as well as moments and ideas" (Wang & Burris, 1997, p. 372). Essentially, participants are charged with taking pictures and telling stories that can be shared with others to enact positive societal changes regarding the photographer's viewpoint of a specific environment (Wang & Burris, 1997).

The use of photovoice builds "on the value of the visual to capture and use visual data in the development of knowledge" (Hansen-Ketchum & Myrick, 2008, p. 207). Individuals are active members of the research process generating data through photos and reflections. The design of photovoice research empowers participants to take photographs of things that are meaningful to them and contribute to knowledge development (Wang & Burris, 1997).

Photos offer a physical and intimate way of understanding participant's experiences (Wang, 1999). The information provided in a photo "captures association of participant's experiences to social networks, culture and history and . . . [evokes] greater cognitive response than words alone" (Hansen-Ketchum & Myrick, 2008, p. 207). Since these photographs are used to develop understanding of individuals and groups, including their beliefs and experiences (Heisley & Levy, 1991), photovoice reveals information about the photographer and not just the image that was captured (Riley & Manias, 2003). When participants select their own photographs based on their preference and meaning (Wang & Burris, 1997), visual data give insight into how participants construct meaning from the chosen images (Mitchell, 2011). Saldaña (2013) stated,

> Just as no two people most likely interpret a passage of text the same way, they won't interpret a visual image in the same way. Each of us bring our background experiences, value system, and disciplinary expertise to the processing of the visual, and thus our personal reactions, reflections, and refractions. (p. 54)

Photovoice data can become richer by participants reflecting and adding captions to selected photos. By doing so, the researcher has the opportunity to analyze photo selection and participants construct the experiences conveyed in the photo. Ruby (1995), as cited in Mitchell (2011), stated, "the study of images alone, as objects whose meaning is intrinsic to them is a mistaken method if you are interested in the ways people assign meaning to pictures" (p. 5). Reflections highlight a participant's construction and interpretation of what the photograph entails (Mitchell, 2011).

According to Hansen-Ketchum and Myrick (2008), the "ontological and epistemological lenses through which research problems are conceived and studies designed provide insight into the rationale for the use of photo methods" (p. 205). This study utilized the ontology of realism and a constructionism epistemology. Realism asserts, "there are real objects that exist independently of our knowledge of their existence" (Schwandt, 1997, p. 133). For realists, entities of the outside world are real, but are interpreted differently based on an individual's frameworks brought to the interaction. Reality exists separate from our minds and determines how we engage with others to learn (Turner, 2008). A constructionism epistemology describes the relationship between the knowledge and the researcher (Crotty, 2010). Meaning is not discovered but constructed through interaction between the participant and the experience (Denzin & Lincoln, 2000). People may construct meaning in different ways, even in relation to the same experience.

Constructivism was used as the theoretical perspective for this study and is defined as "meaning making and constructing of social and psychological worlds within the individual through cognitive processes" (Young & Collin, 2004, p. 375). Constructivism "points out the unique experience of each of us. It suggests that each one's way of making sense of the world is valid and worthy of respect as any other, thereby tending to scotch any hint of critical spirit" (Crotty, 2010, p. 58). Constructivism challenges the individual to reflect on concrete experiences and raise inquiries about the nature of the experience (Merriam, Caffarella & Baumgartner, 2007).

The four researchers involved in the study included three teacher educators and one instructor with a background in agricultural education and qualitative methodology. The teacher educators taught agricultural education in the public school system and are actively involved in preparing preservice teachers at Oklahoma State University. The lead researcher, who has knowledge and experience as a former secondary teacher and principal, and the lead instructor for the course in which this assignment was provided, served as the photovoice facilitator.

Prior to any photovoice experience, it is important for the facilitator to establish the framework by which photos should be taken and have extensive knowledge of the culture under investigation (Wang et al., 1998). The facilitator sets the tone by providing the photographers with a theme by which to take their pictures. The facilitator for this study proposed that preservice students (N = 41) enrolled in a Foundations and Philosophies of Teaching class visit three different secondary agricultural education programs in Oklahoma and take one picture at each program of *the most prominent take-away from the observation*. Students also were instructed to craft a 250-word reflection statement describing their photo. Students were given this assignment in class at the beginning of the Fall 2014 semester and were required to submit three different assignments online by a given point in the semester. Data comprised of three submissions per student totaling 123 pictures and journals. This assignment allowed "students to pay attention to their institution and environment from a different point of view, potentially sharpening their awareness of the problems that they face" (Goodhart et al., 2006, p. 55).

The study employed Saldaña's (2013) method of process coding. Process coding uses gerunds (-'ing' words) to imply action in the data. Codes are transitioned into action to "reserve the fluidity of [the participants] experience and give you new ways of looking at it. These steps encourage you to begin analysis from their perspective" (Charmaz, 2014, p. 121). Process coding can occur simultaneously with initial coding, focused coding, and category construction (Saldaña, 2013). Both the photo and journal were analyzed as one unit of analysis. Each researcher started initial process coding and composed memos throughout the development of codes. Memos entailed researcher observations, impressions, and knowledge to provide context and build a more complete picture (Charmaz, 2014). Following initial coding, researchers conducted focused coding independently before meeting with the research team to discuss the codes and negotiate categories. Categories were grouped into themes relying on codes and memos. To achieve trustworthiness, the following areas were considered: rigor, sincerity, resonance, ethics, and credibility (Tracy, 2010). Data were collected from various agricultural education programs in Oklahoma. Four experienced researchers analyzed data, reviewed codes and memos, and developed categories. Data collection and analysis remained transparent, and researchers disclosed their reflexivity to achieve sincerity and meet ethical standards. Additionally, data were presented through direct quotes and thick description to verify themes. By using gerund codes, researchers tied processes back to the experience, resulting in naturalistic generalizations. To increase credibility, thick description was provided through reviewing a large number of agricultural education programs and through crystallization of the data. Crystallization was achieved through gathering data overtime to bring about a larger picture. Through the use of data sources and memos, multiple accounts of the same story were shared (Tracy, 2010).

Findings and Conclusions

From 123 photovoice submissions, 310 initial process codes were extracted from the data. The research team negotiated 28 focused codes, which were compressed into 13 axial codes or categories. The categories were deduced into six themes: (a) maximizing student aperture, (b) affirming the decision to teach, (c) identifying learning strategy outcomes, (d) balancing the three circles of agricultural education, and (e) creating a felt need to learn.

Maximizing Teacher Aperture

There were several "AHA" moments I had throughout the day; the main thing I really enjoyed about Norman was how the shop was laid out. Mr. [Teacher] designed the shop when he was hired. He especially wanted walls

In the photo above, a sign language instructor has been brought in for the special needs students in the class so that way all students can understand what the teacher is saying. There were a few deaf students in the *to separate the welding booths, which are pictured above. If I am ever asked to lie out a shop I will ensure that there are walls to separate the welding booths instead of the standard tinted plastic. (16:2)*

Agriculture classroom, which can make teaching rather hard for new instructors. (26:1)

Figure 1. Photographs and Reflections from Participant 16 and Participant 26

In photography, maximizing aperture broadens the depth of field bringing greater detail to elements outside the actual plane of focus. This process of maximization of perspective was ever present in the photos and reflections. Following the analogy, the actual plane of focus for these teachers was their lived experience as a secondary agricultural education student. Participant 12 observed her home program, and reflected on the greater depth of field.

> *My last observation was in my home chapter of [Chapter] but it all seemed much different. After taking this course and learning more about the classroom operations and lesson planning, I was able to see my chapter in a much different light. I hate to be critical of my own chapter but it was kind of the example of what not to do in the classroom (12:3).*

Other students did not observe their home program, but repeatedly drew on that experience in resolving conflicts while observing programs. Seven different teachers referenced their home program in this learning process. One student began the reflection by stating that the program observed was "*very similar to my hometown – very small*" (30:2). Participant 25 took a photo of laboratory facilities and shared that, "*facilities close to the classroom was very interesting to me coming from a program that had its own building off campus*" (25:2). Through this process of comparison, numerous students found student diversity to be a concept unseen prior to viewing programs through the wider lens of an educator.

The enhanced awareness of student diversity was emulated through several photo reflections: (a) *"many of his students are poor, and go to an alternative schooling. With that being said, not many students can afford to keep an animal or take care of one" (4:1);* (b) "*I've never had to experience that kind of socioeconomic status. [School] was the most diverse school that I went to. It was diverse in culture, race, socioeconomic status, and learning abilities" (10:3);* (c) *"I learned that the kids in the chapter did not come from the best home lives and the department gave them a place to call home at school" (15:3); and* (d) "*This aquaculture system can give students an option to use for an SAE project – especially for students of lower socioeconomic families. The project is at school so they can check it daily. Plus it's not as expensive as most projects would be for an SAE" (24:2).* Interestingly, the majority of teachers noted socioeconomic diversity rather than racial diversity, which is congruent with the demographics of observation sites selected.

The maximized aperture brought into focus how important facilities and laboratories are to the success of any agricultural education program. Preservice teachers began to envision themselves in their own program and often spoke of facility envy – cataloging examples they deemed worthy. This is a product of EFE discussed by Myers and Dyer (2004). The photo shared for this theme (see Figure 1) by participant 16 highlighted these "*AHA*" moments. Others shared, "*the greenhouse grabbed my attention because it is one of the greatest forms of application there is in an agricultural education program"* (29:3), and "*I picked this photo, because it shows off the* *great new classroom. The facilities had a classroom, plenty of storage rooms, bathrooms, a teacher's office where she could see in the classroom, and a huge welding shop" (15:1).*

Affirming the Decision to Teach

Having something for everyone, at [Chapter] Mr. [Teacher] and his students practice every Sunday evening for trap and skeet. This is how he reaches this group of students. Visiting this school has helped to show me that everything doesn't have to be about livestock like a lot of school in Oklahoma. You can have your specialty but offering more opportunities to get more students involved is more valuable to me than having a champion steer at the county fair. This visit truly made me more confident in my abilities as a future teacher. (25:1)

What I took away most from this experience is just how passionate someone can be about their job. In the picture above, it displays Mr. [Teacher]'s scrapbook from when he was in FFA. The scrapbook showed years of history and projects that helped to make him into the great ag teacher he is today. Looking through this book between classes, I realize that I hope to continue to develop a lifelong passion for education and agriculture that will help me to become a great teacher and role model for students. (15:3)

Figure 2. Photographs and Reflections from Participant 25 and Participant 15

Preservice teachers' decision to teach agriculture was affirmed through the EFE experience. This was encouraging when considering that the interactions associated with an EFE have been found to be the most influential – both positively and negatively (Zuch, 2000). As depicted in the two selected images and reflections (see Figure 2), students reconnected to the affective domains of teaching that drew them to the career originally. Participant 25 seemed to gain affirmation in his abilities as a teacher while participant 15 described an agricultural education revival where he seemed to reconnect to his passion for agriculture and education. The potentially powerful connection between preservice and cooperating teacher also was evident. Participant 16 reflected, "*Mr. [Teacher] was very uplifting and encouraging, and as a college student a few kind words can make all the difference*" (15:2).

Participant 9 shared, "*More than anything, though, it was very inspirational and reassuring for me to see a female ag teacher at a one teacher program doing as well as she is" (9:2).* In a predominantly male dominated profession that is experiencing an increase in female preservice teachers, this valuable affirmation highlighted the value a well-planned EFE could have on female teachers' decision to teach to seek solutions in reducing the gender bias in agricultural educators. Various preservice teachers found affirmation in relating to early career teachers. Participant 28 wrote, "*Mr. [Teacher] is still learning the ropes as a teacher; it was a good look at what my life will be like in just a few years*" (28:3). Though most conclusions seemed to align with our teacher education philosophies, a number of photos depicted theories that warranted further clarification. "*That's why when I become an agricultural educator I plan to encourage all my students to show livestock*" (5:1). We, as teacher educators, would hope to develop further the conclusion of Participant 5 to be more inclusive and career relevant. Career exploration, noted as the primary outcome of exploratory EFE integration (Retallick & Miller, 2010), was one of the primary learning outcomes for preservice teachers in this study.

Identifying Learning Strategy Outcomes

The student pictured above is the one student with previous welding experience; however, he was struggling the day I was there. It was determined the student had not successfully grinded all of the powder coating off the existing metal. She was being a very hands-on teacher and providing discussion afterwards as to what had happened. Ms. [Teacher] would not have been able to properly help him or lead a discussion about what was going on if she had not become actively engaged in the project and appraised the situation herself. (14:1)

Pictured above are the basic items someone would need to understand to begin learning electricity. Looking at these items seems insignificant but, how they were presented over a two-hour lesson was something to witness. As a student of Ag Education it was a sight to see this teacher interact with his students in a very realistic and engaging way. Every student had questions to ask and Mr. [Teacher] always had an answer for them. The whole spectacle was a classic and well executed show and tell/ student inquiry method. (20:1)

Figure 3. Photographs and Reflections from Participant 14 and Participant 20

Preservice teachers identified good and bad teaching, and were drawn to the respective learner consequences. However, they struggled to name or describe fully the strategies being observed. Participant 14 and 20 (see Figure 3) recognized the effectiveness of the approach employed by the teacher, but relied on their own personal labels for those methods. Participant 20 explained that, "*the whole spectacle was a classic and well executed show and tell/student inquiry method*" (20:1). Teachers were judging good and bad learning strategies by the resulting student behavior. One teacher shared "*This was a great opportunity to see the importance of varied teaching methods to appeal to the variety of learners present in a classroom*" (22:1), and another reflected, "*It was so interesting to see how such a simple project had the students engaged and had them using their own creativity. It is a project that is entertaining and something that could be incorporated instead of the basic lecture*" (29:3). In response to a picture of small floral arrangements, a student concluded that, "*Not only did she have the interest of the students, she also had them thinking in the process of how they would place the different flowers*" (29:1).

Though numerous positive examples were shared, one student also identified areas of growth – "*His main teaching style was lecture. His agricultural power and technology class was a hands on class, but no major teaching went on*" (19:1). Another student reflected on a picture of a classroom, “*The content was great . . . the delivery was less than stellar. I actually was very close to falling asleep . . . and the students weren’t fairing much better*” (9:1). Identifying poor strategies and resulting negative products led to rich student reflection and thought. In contrast, participant two noted, “*She asked them if they were awake and so they had the choice to say* yes *or* no*. Giving students a choice is also something I will do*” (2:3), and participant 2 shared, “*I thought that this was a very good representation of how sometimes ag teachers have to fly by the seat of their pants* (2:1)

Balancing the Three Circles of Agricultural Education

This was the first sight I saw when approaching the agricultural education building at [School Name] High School. The poster of the Three Circle Model with Mr. [Teacher]’s contact information under it was not only for looks. It was apparent that Mr. Wells desired to construct his classroom as balanced between FFA, SAE, and classroom as possible. (10:3)

I picked this picture, because I think it describes [Chapter] FFA. They are a career development event and public speaking chapter. While I was in [City Name] observing for the day, I caught onto the fact that everything they taught had something to do with a CDE contest. This picture represents what was lacking which is teaching content besides contest material. (15:2)

Figure 4. Photographs and Reflections from Participant 10 and Participant 15

Preservice teachers learned that the task of managing classroom instruction, a student organization, and supervised agricultural experience programs was important, but very difficult. The tension and internal teacher battle associated with the pressures of winning, teaching, and advising was obvious. The photos and reflections provided for this theme (see Figure 4) highlight both the idealistic balanced philosophy as well as the darker realization that choices are often made based on external pressures. Participant 22 shared, “*Ms. [Teacher] emphasized that with her busy schedule managing both the FFA and 4-H programs she was thankful her years of experience allow her to use only basic plans when planning for instruction*” (22:2). Participant 8 engaged in this discourse by capturing an agricultural educator at a SMART® Board and shared, “*the biggest takeaway is it is not about the awards, recognition, or fame. It is about inspiring students to do their best, instill values, and educate students about agriculture*” (8:2). Researcher memos discussed that this could be the three-circle philosophy of this student – viewed as outcomes rather than processes. Similarly, participant 15 shared a picture of a wall filled with trophies from floor to ceiling and concluded, “*although I think CDE’s have their place in the classroom, I do not think it is all an agriculture educator should care about. What is missing in this picture is teaching content besides contest material*” (15:2). Interestingly, this teacher teacher saw contest material and agricultural content as different curriculums.

Preservice teachers repeatedly noted the added responsibilities associated with managing the full agricultural education program – not just the classroom. Various students noted themselves as different than the standard classroom general education teacher. Describing a picture of three students with animal SAE projects, participant 4 shared, "*That is why I believe becoming an Ag Teacher is much more than just being a regular teacher*" (4:1). Reflecting on a picture of a white board filled with leadership conferences and contest dates, the teacher reflected, "*I feel like planning for these events will take a big part in lesson planning because certain content needs to be taught by the teacher, not a substitute*" (7:2). Reflecting on a photo of a calendar of events, participant 17 shared,

> *He is constantly taking CDE teams or individuals to contests, staying after school to practice with those teams, holding FFA chapter meetings, keeping watch over chapter animals, and much more. The agricultural education teacher has a ton on their plate and it takes hard work and dedication to run a complete program" (17:2).*

One student typified a common abstraction in describing a picture of plaques and awards. "*It was almost like the teachers had lost their passion in a way. In the end, trophies don't mean anything. I'd rather lose and be passionate than win and be bored with my job*" (9:1).

Creating a Felt Need to Learn

Having not graduated from a school with an agricultural education program, I have had very little "shop" experience and was in awe the whole time. I found myself staring at these finished products (along with a round bale feeder not pictured) and thought about all the different tasks, projects, curriculums, contests, and teaching methods agricultural educators either participate in or utilize in their classrooms. Agricultural educators are certainly supposed to be a jack-of-all-trades when it comes to topics and skills covered by our courses. (17:3)

It took Mr. [Teacher] a week to comprehend basic electricity concepts, but that is not what his students thought. They thought that he had known it since birth. My greatest takeaway from [School] High School was that even older teachers need preparation. When I heard that we were sitting through two classes of the same lecture I assumed that I would be easily bored. However, I found myself asking questions about electricity in front of the class as well. (10:1)

Figure 5. Photographs and Reflections from Participant 17 and Participant 10

Preservice teachers realized the need to grow in their knowledge and skills in agriculture. Often, these preservice teachers observed instruction, projects, and required skill sets far above their perceived abilities, as described by participant 17 (see Figure 5). Though it was expected that students would begin to doubt their decision to teach, an alternative conclusion was often shared.

> *Mr. [Teacher] asked me if I have ever worked concrete before and I said* yes. *Then wound up helping teach him and the class how to mix the concrete with the correct*

> *texture for their application. This was because he had never worked it before. This was reassuring to me that you don't have to be an expert at everything to be a good teacher but be willing to learn. (25:3)*

In reflecting on a floral arrangement, participant 13 shared that, "*I am not very familiar with floral design, but she assured us that it is very simple to learn and the students will love the hands on activities" (13:3).* Participant 10 (see Figure 5) came to the realization that learning the science and skills of agriculture is not a task to be completed, but a lifelong process.

Discussion and Praxis

Reflecting on the findings of this study, four of the six purposes (Scherer, 1979) of an effective EFE were accomplished. Preservice teachers examined their own perceptions as a teacher, reduced anxiety leading to an affirmation to remain in agricultural education, became more aware of the realities of school settings, and advanced in their understanding of students and learning. We did not find evidence of enhanced self-confidence in their ability to teach or the acquisition of specific teaching skills. In our analysis, the two elements not achieved would require active experimentation in teaching – an element we removed purposefully. Perhaps it would bring greater clarity to distinguish between early field experiences (EFE) and early field observations (EFO) to clarify the specific processes associated with the *Exploratory* outcomes noted in Retallick's and Miller's (2010) model for EFE.

In the *Exploratory* phase of teacher development, active experimentation (Kolb, 2015), interpreted as actively applying theory as a teacher, is removed purposefully from the approach relieving teachers from anxiety and pressure. Schmidt (2010) synthesized Dewey's (1934) work sharing that "too much emphasis on mechanical 'doing' may result in an experience of 'almost incredible paucity, all on the surface'" (p. 141). Our concept of *Maximizing Teacher Aperture* was congruent with the notion purported by Knowles and Cole (1996) explaining that when students are called to teach, delivering the lesson becomes the actual plane of focus and all other factors lose focus. Completing a true EFO as utilized in this case led to a broader focus that included the classroom, community involvement, school bureaucracy, diversity, use of facilities, and supervision of student projects, and advising of the youth organization.

Smalley and Retallick (2012) suggested that an exploratory EFE *could* lead to higher recruitment and retention of teachers, which must be considered in agricultural education with the current teacher shortage (Foster, Lawver, & Smith, 2014). The opportunity to engage in an EFO, with the freedom to observe and the absence of the pressure to teach, seemed to accomplish exactly what Smalley and Retallick (2012) predicted. Students who have experienced the "reality shock" of teaching early in their teacher preparation program maintained a tempered idealism, a more realistic positive outlook on teaching, and ultimately are retained in the teaching profession (Scherer, 1979, p.213). We would echo the sentiment of Schmidt (2010) and Nierman, Zeichner, and Hobbel (2002) in recommending more EFO opportunities to bring early context, relevance, and discourse to the teacher education process.

Mental models and the process of theory development, as described by Korthagen and Kessels (1999), captured the essence of how meaning was constructed through the EFOs. This conceptual model seems to reflect the five learning outcomes embedded in the *Implementation* section of Retallick's and Miller's (2010) model for EFE development, clarifying further the process leading to the noted outcomes. Congruent to the observation of Schmidt (2010), it was evident that the EFO brought relevance to course concepts and theories and prompted the reflection and refinement of personal gestalts and schemas with support from cooperating teachers, fellow peers, and university supervisors.

This study focused on the *Exploratory* element of the Model for Early Field Experiences in Teacher Education (Retallick & Miller, 2010). Though the model and accompanying literature provided an adequate framework for the EFE process, the *Interaction* portion of the model seemed to suggest a progression from interaction with peers and university supervisors during exploratory strategies to interaction with students and cooperating teachers during the transition to student teaching. We suggest highlighting the constant need for interaction between all four of the noted partners – peers, university supervisors, students, and cooperating teachers. Albers and Goodman (2006) shared that "when we begin to invite cooperating teachers into our university conversations, we can begin to open up ways in which we work. The triadic set of discourses . . . creates good educative environments" (p. 117). Teacher education programs should seek creative ways to involve cooperating teachers as experts in the teacher education process. Suggestions include using Skype™ to include cooperating teachers in course sessions, inviting cooperators for panel discussions, creating expert video series of various cooperators to use in flipped classroom approaches, and having preservice teachers share their Gestalt theories with cooperators to help refine them through interaction with the cooperating teacher.

It was encouraging to find such a strong focus on student diversity in the student photographs and reflections. Teacher education programs are criticized constantly for not preparing preservice teachers adequately to connect with students from diverse backgrounds (Coffey, 2009). The decision to require three observations, the purposeful selection of cooperating sites, and a focus on diversity in the course content seemed to bring into focus the importance of inclusion and respect. Talbert and Edwin (2008) warned, "care must be given to avoid a narrow focus upon cultural differences alone" (p. 59), and explained further the four categories of diversity as gender, ethnicity, socioeconomic status (SES), and geography. Interestingly, in our study the primary focus was on SES and students with disabilities. These two areas of diversity seemed to be what presented themselves most often. Noting the demographics of Oklahoma secondary school populations, this focus seems logical.

Talbert and Edwin (2008) suggested designing an EFE to expose students to each category of diversity, but this presents a somewhat cyclical dilemma in diversity exposure – how can we expose students to diversity that does not exist within agricultural education in our state? Preservice teachers enter the teacher education program with strong beliefs rooted in their personal, and typically quite homogenous, school experiences (Darling-Hammond, 2006). These beliefs are unlikely to change unless they are provided experiences that challenge their validity (Feiman-Nemser & Buchman, 1987). Agricultural education teacher preparation programs may have to look outside of our own classrooms for this challenging experience. Perhaps it would benefit our preservice teachers to observe classrooms outside of agricultural education, engage in community-based field experiences to provide insight into students' lives outside of school (Coffey, 2010), and connect with cooperating teachers more purposefully to discuss creating safe environments where all are respected and can succeed.

A number of additional research questions for future consideration arose:

- At what point are opportunities for active experimentation beneficial to preservice teachers' growth and confidence?
- How would an EFO in classrooms outside of agricultural education expand or challenge students' currently held gestalts or theories?
- Over the course of the teacher preparation program, how is teacher self-concept affected by each field experience?

References

Albers, P., & Goodman, J. (2006). Promoting meaningful discourse through early field experiences. *Teaching Education*. *10*(2), 103–118. doi:10.1080/1047621990100211

Banks, M. (2007). *Using visual data in qualitative research.* Thousand Oaks, CA: Sage Publications, Ltd.

Borron, A. S. (n.d.). Picturing the underserved audience: Photovoice as method in applied communication research. *Journal of Applied Communications, 97*(4), 6–18.

Charmaz, K. (2014). *Constructing grounded theory*. Thousand Oaks, CA: Sage Publications.

Coffey, H. (2010). "They taught me": The benefits of early community-based field experiences in teacher education. *Teaching and Teacher Education, 26*, 335– 342. doi:10.1016/j.tate.2009.09.014

Crotty, M. (2010). *The foundations of social research: Meaning and perspective in the research process*. Thousand Oaks, CA: Sage Publications.

Darling-Hammond, L., Chung, R., & Frelow, F. (2002). How well do different pathways prepare teachers to teach? *Journal of Teacher Education, 53*(4), 286–302. doi:10.1177/0022487102053004002

Darling-Hammond, L. (2006). *Powerful teacher education: Lessons from exemplary programs*. San Francisco, CA: Jossey-Bass.

Denzin, N. K., & Lincoln, Y. S. (2000). *The sage handbook of qualitative research* (4th ed.). Thousand Oaks, CA: Sage Publications.

Dewey, J. *Art as experience.* New York: Perigee Books.

Feiman-Nemser, S., & Buchman, M. (1983). *Pitfalls of experience in teacher preparation.*

Occasional Paper No. 65. Washington, DC: ERIC document.

Feiman-Nemser, S., & Buchman, M. (1987). When is student teaching teacher education? *Teaching and Teacher Education*, *3*(4), 255–273. doi:10.1016/0742-051X(87)90019-9

Foster, D. D, Lawver, R. G., & Smith, A. R. (2014). *National Agricultural Education Supply and Demand Study.* American Association for Agricultural Education.

Goodhart, F. W., Hsu, J., Baek, H., Coleman, A. L., Maresca, F. M., & Miller, M. B. (2006). A view through a different lens: Photovoice as a tool for student advocacy. *Journal of American College Health*, *55*(1), 53–56. doi:10.3200/JACH.55.1.53-56

Goodman, J. (1988). Constructing a practical philosophy of teaching: A study of preservice teachers' professional perspectives. *Teaching & Teacher Education*, *4(*2), 121–137.

Guyton, E., & Byrd, D. (2000). *Standards for field experience in teacher education.* Reston, VA: Association of Teacher Educators.

Hansen-Ketchum, P., & Myrick, F. (2008). Photo methods for qualitative research in nursing: An ontological and epistemological perspective. *Nursing Philosophy*, *9*(3), 205–213. doi:10.1111/j.1466-769X.2008.00360.x

Heisley, D. D., & Levy, S. J. (1991). Autodriving: A photoelicitation technique. *Journal of Consumer Research*, *18* (3), 257–272.

Hulling, L. (1998). *Early field experiences in teacher education*. Washington, DC: ERIC Clearinghouse on Teaching and Teacher Education.

Korthagen, F. A. J., & Kessels, J. P. A. M. (1999). Linking theory to practice: Changing the pedagogy of teacher education. *Educational Researcher, 28*(4), 4–17.

Knowles, J. G., & Cole, A. L. (1996). Developing practice through field experiences. In F. B. Murray (Ed.), *The teacher educator's handbook: Building a knowledge base for the preparation of teachers* (pp. 648–688). San Francisco, CA: Jossey-Bass.

Kolb, D. A. (2015). *Experiential learning: Experience as the source of learning and development* (2nd ed.). Upper Saddle River, NJ: Pearson Education Inc.

Martin, N. (2008). Assessing portrait drawings created by children and adolescents with autism spectrum disorder. *Art Therapy: Journal of the American Art Therapy Association, 25*(1), 15–23.

McIntyre, D. J. (1983). *Field experience in teacher education: From student to teacher.* Washington, DC: Foundation for Excellence in Teacher Education.

Minogue, J. (2010). What is the teacher doing? What are the students doing? An application of the draw-a-science-teacher-test. *Journal of Science Teacher Education, 21*, 767–781. doi:10.1007/s10972-009-9170-7

Mitchell, C. (2011). *Doing visual research*. Thousand Oaks, CA: Sage Publications.

Moore, R. (2003). Reexamining the field of experience of perservice teachers. *Journal of Teacher Education, 54*(1), 31–42. doi:10.1177/0022487102238656

Myers, B. E., & Dyer, J. E. (2004). Agriculture teacher education programs: A synthesis of the literature. *Journal of Agricultural Education, 45*(3), 44–52. doi:10.5032/jae.2004.03044

Nierman, G. E., Zeichner, K., & Hobbel, N. (2002). Changing concepts of teacher education. In R. Colwell & C. Richardson (Eds.), *The new handbook of research on music teaching and learning* (pp. 818-839). New York: Oxford University Press.Merriam, S. B., Caffarella, R. S., & Baumgartner, L. M. (2012). *Learning in adulthood: A comprehensive guide*. San Francisco, CA: John Wiley & Sons.

Retallick, M. S., & Miller, G. (2007a). Early field experience in agricultural education: A national descriptive study. *Journal of Agricultural Education, 48*(1), 127–138. doi:10.5032/jae.2007.01127

Retallick, M. S., & Miler, G. (2007b). Early field experience documents in agricultural education. *Journal of Agricultural Education, 48*(4), 20–31. doi:10.5032/jae.2007.04020

Retallick, M. S., & Miller, G. (2010). Teacher preparation in career and technical education: A model for developing and researching early field experiences. *Journal of Career and Technical Education*, *25*(1). Retrieved from schlar.lib.vt.edu/ojs/ejournals/JCTE/v25n1/retallick.html

Riley, R. G., & Manias, E. (2003). Snap-shots of live theater: the use of photography to research governance in operating room nursing, *Nursing Inquiry*, *10*(2), 81–91 . doi: 10.1046/j.1440-1800.2003.00166.x

Saldaña, J. (2012). *The coding manual for qualitative researchers* (No. 14). Thousand Oaks, CA: Sage Publications.

Santrock, J. W. (2004). *Educational psychology* (2nd ed.). Boston, MA: McGraw-Hill Companies, Inc.

Scherer, C. (1979). Effects of early field experience on student teachers' self-concepts and performance. *The Journal of Experimental Education*, *47*(3), 208–214. Retrieved from http://www.jstor.org/stable/20151277

Schmidt, M. (2010). Learning from teaching experience: Dewey's theory and preservice teachers' learning. *Journal of Research in Music Education, 58*(2), 131–146. Retrieved from http://www.jstor.org/stable/40666239

Schwandt, T. A. (1997). *Qualitative inquiry: A dictionary of terms*. Thousand Oaks, CA: Sage Publications.

Sherer, C. (1979). Effects of early field experience on student teachers' self-concepts and performance. *The Journal of Experimental Education, 47*(3), 208–214.

Smalley, S. W., & Retallick, M. S. (2012). Agricultural education early field experience through the lens of the EFE model. *Journal of Agricultural Education, 53*(2), 99–109. doi:10.5032/jae.2012.02099

Strack, R. W., Magill, C., & McDonagh, K. (2004). Engaging youth through photovoice. *Health Promotion Practice, 5*(1), 49–58. doi:10.1177/1524839903258015

Talbert, B. A. & Edwin, J. (2008). Preparation of agricultural education students to work with diverse populations. *Journal of Agricultural Education, 49*(1), 51–60. doi:10.5032/jae.2008.01051

Tracy, S. J. (2010). Qualitative quality: Eight "big-tent" criteria for excellent qualitative research. *Qualitative Inquiry, 16*(10), 837–851. doi:10.1177/1077800410383121

Wang, C. (1999). Photovoice: A participatory action research strategy applied to women's health. *Journal of Women's Health, 8*(2), 185–192. doi:10.1089/jwh.1999.8.185

Wang, C., & Burris, M. A. (1997). Photovoice: Concept, methodology, and use for participatory needs assessment. *Higher Education & Behavior, 24*(3), 369–387. doi: 10.1177/109019819702400309

Wang, C., Yi, W. K., Tao, Z. W., & Carovano, K. (1998). Photovoice as a participatory health promotion strategy. *Health Promotional International, 13*(1), 75–86. doi:10.1093/heapro/13.1.75

Wideen, M., Mayer-Smith, J., & Moon, B. (1998). A critical analysis on learning to teach: Making the case for an ecological perspective on inquiry. *Review of Educational Research, 68*(2), 130–178. doi: 10.3102/00346543068002130

Young, R. A., & Collin, A. (2004). Introduction: Constructivism and social constructionism in the career field. *Journal of Vocational Behavior, 64*, 373–388. doi: 10.1016/j.jvb.2003.12.005

Zuch, M. A. (2000). Early training and development initiatives used to recruit for teaching careers: A Texas A&M University study. Dissertation Abstracts International, 61(11A), 4252.

A Case Study Of Preservice Teachers Receiving Curriculum For Agricultural Science Education Training In A Semester Course

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Abstract

This qualitative case study focused on 20 preservice teachers enrolled in a course that focused on the integration of science in agricultural education. The course used the scope and sequence of a Curriculum for Agricultural Science Education (CASE) Institute thus providing the preservice teachers with the 65 hours of required professional development to be CASE certified. The Theory of Planned Behavior was used to explore the participants' intentions for integrating science in agricultural education through the use of CASE curriculum. The three factors that Ajzen (1991) claims to impact a person's intentions to perform a behavior were explored through classroom observations, preservice teachers' journals, and one-on-one interviews. Participants showed a positive attitude toward science integration and the CASE curriculum. The participants had mixed opinions about how much science is currently being integrated in agricultural education and identified some barriers (mainly the expense of supplies and equipment needed to teach the CASE curriculum) that could impact their perceived behavioral control. The students had high intentions to integrate science in their instruction and to use CASE curriculum in the future.

Introduction

The National Research Council (NRC) (1996) has promoted the use of inquiry-based learning in science education. Inquiry has been defined as "a set of interrelated processes by which scientists and students pose questions about the natural world and investigate phenomena; in doing so, students acquire knowledge and develop a rich understanding of concepts, principles, models, and theories" (NRC, 1996, p. 214). Agricultural education has historically taken a "hands-on" approach to teaching and learning. Researchers have identified similarities of problem-solving, which is commonly used in agricultural education, with inquiry-based learning (Parr & Edwards, 2004). Inquiry-based learning has been the focus of several studies in the field of agricultural education. A case study of the implementation of inquiry-based learning in one agricultural classroom found that while students were involved in the procedural steps of scientific inquiry they did not engage in the inquiry process (Grady, Dolan, & Glasson, 2010). Conversely, a study of 437 students in 10 high schools across the United States concluded that students who were taught with inquiry-based instruction had higher scientific reasoning than students who were taught through the subject matter approach (Thoron & Myers, 2012b). Other studies showed that students taught with inquiry-based instruction had higher argumentation skills (Thoron & Myers, 2012a); inquiry-based instruction is an effective method of instruction with special needs students (Easterly, III & Myers, 2011). Additionally, students taught agriculture with inquiry-based instruction had a favorable attitude toward agriscience (Thoron & Burleson, 2014). Research on the implementation of inquiry-based learning in agricultural education indicates that barriers to implementing inquiry-based instruction are lack of funding for supplies and equipment, lack of curriculum highlighting science integration, lack of training on how to integrate science, and lack of planning time (Washburn & Myers, 2010). A study that compared stages of concern regarding inquiry-based instruction for teachers who had received one week of training in inquiry-based instruction versus teachers who had received two weeks of training (one week for two years) showed that teachers who received more training had less concerns overall. However, teachers who had received two weeks of training did indicate more concern about collaboration (Shoulders & Myers, 2011). Recommendations have been repeatedly made for teacher preparation programs in agriculture education to provide training in inquiry-based instruction (Grady et al., 2010; Shoulders & Myers, 2011; Thoron & Burleson, 2014; Thoron & Myers, 2012a; Thoron & Myers, 2012b; Thoron, Myers, & Abrams, 2011; Washburn & Myers, 2010).

The Curriculum for Agricultural Science Education (CASE) utilizes inquiry-based learning in its curriculum. CASE provides a curriculum that not only aligns its lessons with the National Science Education Standards (NRC, 1996) but also with Common Core Mathematics (National Council of Teachers of Mathematics, 2000) and Common Core English Standards (National Council of Teachers of English, 1996). As new CASE courses are written and the existing lessons are revised, alignment with Next Generation Science Standards is being conducted (S. A. Smith, personal communication, January 28, 2015). CASE is a project of the National Council for Agricultural Education which began in 2007 (Ulmer, Velez, Lambert Thompson, Burris, & Witt, 2013). Curriculum is just one component of the CASE Model; other components include assessment, certification and professional development (CASE, 2014b).

At the heart of the CASE Model is professional development. “The strength of CASE is in the intense and thorough professional development provided to all those who choose to adopt the curriculum” (CASE, 2014a, p. 1). In order for a teacher to use the CASE curriculum they are required to participate in a CASE Institute which provides 65 to 90 hours of training. The amount of professional development required is dependent on the course being taught. These institutes are typically held in the summer at various locations across the country and last for seven to 10 days. Teachers are required to attend the entire institute in which they will gain experience with most of the activities, projects, and problems that are included in the curriculum they will be teaching (S. A. Smith, personal communication, January 27, 2015). Participants also learn about the pedagogy behind the CASE curriculum (Ulmer et al., 2013) and about the other support systems involved with CASE. The scope and sequences for each institute are developed by the CASE staff to ensure consistency between institutes. From 2009 to 2014, 916 teachers from 38 states have attended a CASE Institute (S. A. Smith, personal communication, January 27, 2015).

In a study of secondary animal science students, researchers compared the engaged time of students who were taught with CASE curriculum to those taught without the CASE curriculum. The study revealed that students enrolled in the courses taught with the CASE curriculum spent more time actively engaged than students who were not taught with the CASE curriculum (Witt, Ulmer, Burris, Brashears, & Burley, 2014). A qualitative study of five teachers (teaching a total of 353 students) utilizing CASE curriculum revealed that the curriculum met the needs of students differently, provided a routine for the students, and required a lot of reading

(Velez, Lambert, & Elliott, 2012). The study also highlighted teachers' concerns for balancing the curriculum with other aspects of the agriculture program such as managing the greenhouse. Further research of CASE provided evidence that CASE Institutes had long-term impacts on teachers' personal efficacy (Ulmer et al., 2013). More support of CASE Institutes was revealed in a case study of multiple teachers implementing the CASE curriculum. The five themes that emerged from the study of five teachers were: a) teachers adapt to the student-centeredness of the curriculum differently; b) teachers liked having access to prepared content but none of them completed the entire curriculum; c) they found the materials and equipment essential for implementing the curriculum; d) teachers viewed attending the CASE Institute as vital to implementing the curriculum; and e) implementing CASE provided teachers a chance to refocus (Lambert, Velez, & Elliott, 2014).

A study of CASE certified teachers in Iowa surveyed the level of CASE implementation and resulted in 86 usable responses. The study reported that teachers taught an average of 71.97% (*SD* = 29.71) of available lessons in the CASE curriculum and 78% of teachers reported they used at least 50% of the CASE curriculum. These teachers said that they liked the structure of the curriculum, the increased level of student engagement, and that students learned critical objectives in agriculture. Teachers felt that the students had a positive attitude toward the CASE curriculum (Heintz & Retallick, 2014).

In the summer of 2015, 30 CASE Institutes will be hosted at 22 sites across the nation. These institutes are typically attended by new and current agriculture teachers. However, each year Iowa State University hosts a CASE Institute for the *Introduction to Agriculture, Food, and Natural Resources* course that is restricted to preservice teachers. These institutes follow the same format as the in-service CASE Institutes (S. A. Smith, personal communication, January 27, 2015).

Texas Tech University also offers CASE training to preservice teachers, but through a semester-long class that integrates the scope and sequence from the *Principles of Agriculture – Animal* CASE Institute. This CASE course requires 65 hours of professional development which is provided through the class entitled *Integrating Science in Agricultural Education*. The semester format allows the instruction to include everything from the scope and sequence designed by the CASE staff and additional instruction on the integration of science into agricultural education. To date this class has been taught Fall 2013 and Fall 2014 (Carraway, Ulmer, Street, & Barton, 2014).

This study addressed Priority Five, Efficient and Effective Agricultural Education Programs, of the National Research Agenda for the American Association for Agricultural Education (Doerfert, 2011).

Theoretical Framework

The theoretical framework for this study is based on the Theory of Planned Behavior (Ajzen, 1991). This theory postulates that a person's behavior is dependent on their intention to perform that behavior. Their intention is shaped by their attitude toward the behavior, the subjective norm in relation to the behavior, and their perceived behavioral control. Typically, the more positive the attitude and subjective norm in regard to the behavior and the stronger the perceived behavioral control, the greater the individual's intention to perform the behavior at question (Ajzen, 1991).

The Theory of Planned Behavior has been used in an abundance of research in agricultural education including some that closely relates to this study. The Theory of Planned Behavior has been used to determine different individuals' perceptions of integrating science into agricultural education (Myers & Thompson, 2009; Myers & Washburn, 2008; Thompson & Warnick, 2007; Thoron & Myers, 2010; Warnick, Thompson, & Gummer, 2004). In general, these studies show that different stakeholders have a positive attitude toward the integration of science into agricultural curriculum but they also identify some barriers to this integration. Repeatedly, lack of funding, training, integrated curriculum, and time for collaboration are identified as barriers to integrating science into agriculture classrooms (Myers & Thompson, 2009; Myers & Washburn, 2008; Thoron & Myers, 2010; Warnick et al., 2004). These barriers affect the perceived behavioral control of the individuals.

In the scope of this study, the behavior at question is the integration of science content in the agricultural classroom by using the CASE curriculum. The participants' attitudes are seen as their perception of integrating science into agricultural education and their perception of the CASE curriculum. The subjective norm is what is currently being done in secondary agriculture classrooms and what people they associate with think about science integration and the CASE curriculum. Finally, perceived behavioral control is the participants' confidence in integrating science in their teaching as well as challenges they foresee.

Purpose of the Study

The purpose of this study was to describe preservice teachers' intentions to integrate science in agricultural education by using the CASE curriculum. More specifically, the following objectives provided structure for the research:

1. Determine participants' attitude toward integrating science into agricultural education through the use of CASE curriculum.
2. Determine participants' perceptions of the subjective norm of integrating science into agricultural education through the use of CASE curriculum.
3. Determine participants' perceived behavioral control of integrating science into agricultural education through the use of CASE curriculum.
4. Determine participants' intentions to integrate science into agricultural education through the use of CASE curriculum.

Methodology

This qualitative study was phase two of a larger study. Phase one of this study utilized a quantitative approach to investigate the science and animal science content knowledge of preservice teachers enrolled in *Integrating Science in Agricultural Education.* Qualitative research can be used to study a unique situation (Erlandson, Harris, Skipper, & Allen, 1993) and was chosen for phase two of this study because this group of preservice teachers is unique in that Texas Tech University is currently the only university providing CASE training for preservice teachers through a semester-long course. Instead of being able to generalize the results of this study, it is intended to provide a thick rich description of the situation so the reader may transfer the knowledge to similar situations in the future (Erlandson et al., 1993).

For this study, the case was the *Integrating Science in Agricultural Education* class taught at Texas Tech University in the Fall of 2014. There were 20 preservice teachers enrolled in the class and all 20 were the focus of the study. The research was approved by the university's Institutional Review Board (IRB).

Multiple data sources were used in this study to establish triangulation of data. Data collection in qualitative research typically occurs in the natural setting of the participants. This allows the researcher to see the participants in their natural setting (Creswell, 2013). The main researcher was a complete participant (Creswell, 2013) since she was present in the class every day, conducted the interviews, and provided prompts for the preservice teachers' journal entries.

The class met twice a week for a total of six hours a week the entire semester. During this time the researcher interacted with and observed the participants. The researcher kept a reflexive journal and made entries every week about the class and the study. The researcher also discussed observations with the professor who taught the class, as well as participants, to ensure the observations were interpreted correctly.

As a part of the class, the preservice teachers were required to keep a journal and were allotted class time to make journal entries. Preservice teachers were asked to journal at the beginning of the semester and after every three units of instruction. There were a total of nine units of instruction so preservice teachers made journal entries four times total. Some of the same prompts were used each time to determine if attitudes were changing throughout the semester. Preservice teachers kept electronic copies of the journal and were asked to turn them into the researcher at the end of the semester if they chose to have them included in the research. In total 15 of the 20 preservice teachers allowed their journals to be used for data analysis.

At the end of the semester, the preservice teachers were asked to volunteer for a one-on-one interview with the primary researcher. Of the 20 preservice teachers in the study, 19 chose to participate in the interview. The one who did not participate in the interview did provide the researcher with her journal so her thoughts were still represented in this study. The interviews lasted 10 to 25 minutes and utilized a semi-structured format with 24 guiding questions. Interviews were audio recorded and transcribed verbatim.

The constant comparative method of data analysis (Erlandson et al., 1993) was employed in this study. Observations made in the class were constantly compared to data the researcher had already collected from prior observations. At the end of the semester, the researcher compared data from the journal entries and interviews with data from the observations. Data were grouped based on how it related to the objectives of the study.

Several strategies were employed to increase the trustworthiness of this study. Prolonged engagement and persistent observation (Lincoln & Guba, 1985) were both techniques used to fully understand the participants and their views. In this study the three sources of data came from observations, journals, and interviews and aided in triangulation. Member checks were also conducted to add to the credibility of this study.

In depth descriptions and details were provided to help with the transferability of this study. To promote dependability, an audit trail of all documents, interview transcriptions, a reflexive journal, and notes related to the study were kept so a dependability audit could be conducted (Lincoln & Guba, 1985). These sources can also be used in a confimability audit to allow the auditor to "determine if the conclusions, interpretations, and recommendations can be traced to their sources and if they are supported by the inquiry" (Erlandson et al., 1993, p. 35).

Measures were taken to protect the privacy of the participants. Participants were assigned pseudonyms to protect their anonymity. All data were kept in either a password-protected computer or a locked drawer in the researcher's locked office.

The researcher was a former agricultural science teacher who was a graduate student at Texas Tech University while researching this topic. As an agriculture teacher for sixteen years, the researcher was not familiar with CASE but had taught some animal science courses including one for science credit. As a graduate student, the researcher had participated in a CASE Institute for Principles of Agriculture – Animal. The participant also had observed these participants in other agricultural education courses as a part of her graduate program. Since the researcher was present in other agricultural education classes the participants had an existing rapport with the researcher and were open to discuss their feelings with her. They also behaved as they normally would since they were used to the researcher being in their classroom. Since the researcher had prior experience teaching animal science for science credit and attended a CASE Institute herself, she made an effort to control researcher bias.

Findings

The purpose of this study was to describe preservice teachers' intentions to integrate science in agricultural education by using the CASE curriculum. Through the constant comparison of preservice teachers' journal entries, interview transcriptions, and the researcher's reflexive journal of observations the following findings were developed.

Objective 1: Determine participants' attitude toward integrating science into agricultural education through the use of CASE curriculum.

As a whole, the group was very supportive of the integration of science in agricultural education. The participants' journal entries reflected they saw science as a big part of agriculture and some viewed agriculture as an applied science. "I think there is a lot more science involved in agriculture than people think. Science is basically the base of everything that we do in agriculture" said Kayla (Journal 8, pg. 2). "To me, agriculture is mostly a scientific industry. Most things having to do with agriculture are related to science" said Casey (Journal 3, pg. 2).

Throughout the class, the participants' discussions seemed to support the notion that agriculture involves science and therefore agricultural education should integrate science.

During the interviews conducted at the end of the semester, preservice teachers were asked what subjects they saw integrated into the CASE Principles of Agriculture – Animal curriculum that was used in their class. Collectively, the participants identified English, math, science, history, art, technology, public speaking, writing, and reading as subjects that were integrated into this curriculum. They did not all identify every subject in this list, but all the participants who were interviewed identified science as one of the subjects that was integrated. When asked what they thought about this integration, the participants were all very positive and thought it was a good thing. "I think that it is good. I think it shows students that what they learn in a regular math or science class can be used in agriculture as well" said Mandy (Interview 4, pg.2, lines 1-2). "I like it. I think that it makes ag more diverse and it will help the administration really approve this program" said Heather (Interview 9, pg. 2, lines 8-9).

Throughout the semester, the participants were asked, in their journal entries, what they liked and did not like about the CASE curriculum. The researcher continuously asked the prompt to see if there were any changes in the participants' perceptions. Participants were also asked the same questions during their interview to see if they responded the same way after reflecting on a semester experience with the CASE curriculum. The journal entries and the responses to the interview questions were positive toward CASE. Participants were always able to list things they liked about CASE, but sometimes had trouble identifying what they did not like. The biggest theme that emerged in the things that the participants liked were related to the amount of student centered learning that took place and they thought secondary students would enjoy the interactive lessons. Most participants identified this in some fashion throughout the semester. Sally said:

> I like the hands on aspect of it. It gets you up out of your seat and on your feet and I think that makes it not only is more enjoyable but it makes it, as a student going through certification class I can see high school students thinking it is fun because it kind of makes time go by faster, you're not just sitting there listening to lectures (Interview 7, pg. 1, lines 27-30).

The students also showed an appreciation for the structure that CASE provides and that it gave them a year-long plan to follow. "It lays out what you need to teach but it also lets you make the changes you need to." said Cindy (Interview 17, pg. 1, line 20). Another aspect that the participants seemed to like about CASE was how creative it was. Ellie said:

> I think my favorite part of the curriculum is its creativeness. There are tons of different techniques that CASE uses and a lot of them are out of the box and so it makes it more fun for the students. It really gets them engaged and interested and helps spark their curiosity (Interview 10, pg. 1, lines 24-26).

Objective 2: Determine participants' perceptions of the subjective norm of integrating science into agricultural education through the use of CASE curriculum.

At the beginning of the semester, one of the journal entries asked preservice teachers to describe the extent to which they feel that science is integrated into secondary agricultural education. Preservice teachers were told to reflect on their own personal experiences in secondary agricultural education, as well as programs in which they were familiar. The majority of the participants did not feel that secondary agricultural teachers currently integrate science into their instruction. “I don’t think much science is used in agricultural classrooms in the secondary level” said Julianna (Journal 9, pg. 1). “In my ag experience in high school, we did not focus too much on science topics in the classroom” said Casey (Journal 3, pg. 2).

However, a few of the participants thought that science was integrated in agricultural education. Lindsey said:

> Agricultural education integrates science in a major way. Since agriculture is closely linked to science, there is a need to teach science in ag classes. From personal experience, the science I learned in my ag classes prepared me academically and personally, as I found out that ag was the field for me. I remember a particular exercise looking at parasites through microscopes in the veterinary medical applications class (Journal 14, pg. 2).

“In my experience we used science, for example we conducted experiments on plants” Rachel said (Journal 1, pg. 2).

The participants’ perceptions of the subjective norm is influenced by their views of what is currently being done and what other people think about the integration of science through the use of CASE curriculum. To determine what the social acceptance of the CASE curriculum is, the participants were also asked what people that they talked to about CASE thought about it. The majority of the participants said they had discussed CASE with their family and/or friends and that they thought positively about it. Participants also talked to students from other universities, professors from other universities, and agriculture teachers about CASE. Everyone said they got positive responses from the people they told about the CASE curriculum and what they were learning. Harper said:

> I talked to some of my ag teaching friends about CASE and they were all very interested. They have all kind of heard about this experience and wanted to know more about it before they took the next step to certify. I also talked to some college professors in other areas about it and they were interested in how they could incorporate it into their student teaching experience as well (Interview 14, pg. 3, lines 1-5).

Objective 3: Determine participants’ perceived behavioral control of integrating science into agricultural education through the use of CASE curriculum.

In the interview, the participants were asked how comfortable they were in teaching an animal science class, to integrate science while teaching animal science, and to integrate science in teaching any agriculture course. The responses to all three of these questions were compared to determine if they were uncomfortable with the science integration or the subject matter. Most of the participants expressed that this class helped them feel more confident in integrating science in an animal science class. “I feel more comfortable now after taking this class in teaching it in a scientific way” said Rachel (Interview 18, pg. 1, line 14). “Yes, with CASE I feel that I could teach it with no problem” said Baylee (Interview 12, pg. 1, line 15).

A majority of the participants also testified that what they learned through this class would help them integrate more science into other agricultural subject matter. “Yes, I feel like CASE has not just taught me animal science but has taught me how to integrate science into any agriculture or pretty much any other course I teach” said Harper (Interview 14, pg. 1, lines 18-19).

The four themes that emerged relating to the barriers or challenges that the participants foresee revolve around funding, the length of and instructions in the CASE lessons, the ability or interest of the secondary students, and their ability to complete the entire curriculum.

The biggest challenge that the participants identified to integrating science into agricultural education through the use of CASE curriculum dealt with funding. Participants were concerned that the cost of equipment and supplies needed would prevent school administration from allowing them to use the curriculum. Others were just concerned that they would not have enough financial support to buy the materials they would need to teach the curriculum. “Having a budget that I need to be able to teach the students” said Will (Interview 5, pg. 1, lines 22-24).

Since the participants were concerned about the expenses related to CASE and some expressed that they would have to convince the school to allow them to use the CASE curriculum, the participants were asked how comfortable they would be as a first year teacher to ask a school to provide funds so they could use the CASE curriculum in their class. The responses were pretty evenly split. Approximately half of the participants said they would not feel comfortable asking for this funding as a first year teacher. “Not very comfortable because I know it is very costly” said Heather (Interview 9, pg. 3, line 3). “However, the other half of the participants said they would feel comfortable asking. Penelope said:

> I thoroughly believe enough in CASE that it wouldn’t bother me, due to money wise, I wouldn’t feel hurt if they said no. I would definitely outline the strong points of CASE being core based. I think that helps too that it has math, science, and all that good stuff in it. And yea I wouldn’t have a problem at all asking and maybe trying and doing like a meeting about it and talking to them about the great points about it and explaining it (Interview 1, pg. 4, lines 3-7).

“I think I would be comfortable if I went and showed them how it was going to benefit the students in their other subjects because I think they would like that” said Kayla (Interview 13, pg. 2. Lines 22-23).

This question was followed up with asking the participants if they would be more comfortable the next year. All of the participants said they would be more comfortable asking the second year after they had a chance to know the school and administrators. “Probably, just because after being there a year I would have built some rapport with them” said Ellie (Interview 10, pg. 3, line 9).

Participants also identified that some of the CASE lessons were too long for secondary class schedules. They also felt some of the instructions were confusing or could be worded better. “I think some of the labs and maybe the timing of them and the timing that they set out for their activities might be a little hard to integrate into our class scheduling” said Ellie (Interview 10, pg. 2, lines 1-3). “Some of the instructions are unclear” said Kim (Journal 7, pg. 4).

In addition, they were concerned about the ability and interests of the secondary students. They were not sure all students would have the academic ability to participate in all of the lessons and that some students would not be interested in taking an agriculture course that was too science based. “Maybe the students you have are not the best at math or science, getting the students and keeping them involved and not chasing them away, really just keeping them involved in the class” said Toby (Interview 8, pg. 1, lines 17-18).

Finally, participants were concerned about their ability to stick to the schedule provided by CASE. They anticipated that they would not be able to teach the entire curriculum in one school year. “My biggest challenge I will face is that I am pretty unorganized and teaching this I will have to stay organized and stay up to date and on task to get through before the school year is over” said Will (Interview 5, pg. 2, lines 5-7).

Objective 4: Determine participants’ intentions to integrate science into agricultural education through the use of CASE curriculum.

During the interview, the participants were asked the likelihood that they would use the CASE curriculum in the future. One of the participants said she had decided not to teach and was not even going to student teach the next semester. All the rest of the participants said if their school allowed it and would fund it, they would use the CASE curriculum. “I would enjoy using it. I think it integrates all the subjects and includes some good information” said Lindsey (Interview 2, pg. 2, lines 20-21). “Pretty high as of this point right now. It’s just such a great thing, I feel like it’s too good of a tool to not use” Penelope said (Interview 1, pg. 3, lines 29-30). “I think I would use it if the school allowed me to purchase it because it is beneficial to the students” said Kayla (Interview 13, pg. 2, lines 18-19). Baylee said,

> I think 100%. I want to try to get certified in AFNR, Plant and Food Science and kind of have a whole department based on the CASE program and to be able to teach it, so that every class they take not only has a better science credit and involves the FFA but they are still learning a bunch more than in a regular ag class (Interview 12, pg. 3, lines 3-6).

Conclusions

Looking through the lens of the Theory of Planned Behavior (Ajzen, 1991), the desired behavior is the participants’ intent to teach in a scientific manner through the use of the CASE curriculum. Their intention is based on their attitude toward the integration of science in agricultural education and of the CASE curriculum. The subjective norm is basically the social acceptance of integrating science in agricultural education. The perceived behavioral control is impacted by participants’ confidence that they could integrate science in their classroom and what challenges they feel they will face in using the CASE curriculum in the future.

The group of 20 preservice teachers, who received CASE training for the course *Principles of Agricultural Science – Animal* in the Fall of 2014, had very positive attitudes toward the integration of science into agricultural education and of the CASE curriculum. This finding is in agreement to research that showed that agriculture teachers have a positive attitude toward the integration of science into agriculture curriculum (Myers & Thompson, 2009; Myers & Washburn, 2008; Thompson & Warnick, 2007; Thoron & Myers, 2010;). The positive attitude about the CASE curriculum also aligns with research of the implementation of CASE curriculum (Lambert et al., 2014; Heintz & Retallick, 2014). In addition, the participants in this study expressed that agriculture is scientific so science should be integrated into agricultural education. The participants thought students would benefit from this form of science integration. Studies indicated that agriculture students taught with inquiry-based instruction have higher scientific reasoning skills (Thoron & Myers, 2012b) and higher argumentation skills (Thoron & Myers, 2012a). Witt et al. (2014) found students who were taught with CASE curriculum were more actively engaged than students who were not taught with CASE curriculum. The participants of this study saw the CASE curriculum as very interactive and student centered, which would lead to more active engagement by students. Active engagement was also seen by Iowa agriculture teachers who had implemented CASE curriculum (Heintz & Retallick, 2014). The participants thought that the students would enjoy the lessons. The participants liked that the curriculum was planned out and that it provided resources for both students and teachers. Lambert et al. (2014) also found that teachers appreciated the structure of the CASE curriculum. In general, the participants had a positive attitude toward the integration of science in agricultural education and of the CASE curriculum.

The subjective norm is based on what the participants thought was currently being done in agricultural education based on their own experiences in secondary agriculture classes and from agricultural education programs they were familiar with. This subjective norm was also influenced by the people who the participants talked to about CASE and what their reactions to it were. The group had differing views as to how much science was currently being integrated into agricultural education in secondary schools. A majority of the participants did not think that secondary agriculture classes included much science but some of them thought there was science included in secondary agricultural instruction. This split can also be seen from the discussions that the participants had with their cooperating teachers and other people about the CASE curriculum. The participants had different experiences when talking to people about CASE. A few people they encountered already knew about CASE but most of them did not. However, most of the participants received positive feedback after explaining what CASE involved. This results in a subjective norm that is really unclear and can be interpreted differently by each participant based on their experiences and their own interactions with people. It appears that some of the participants would feel that integrating science and using the CASE curriculum would be socially acceptable and that other participants would see it as doing something outside the norm. Research that has been conducted in different states across the country indicate that there is support for science integration (Myers & Thompson, 2009; Myers & Washburn, 2008; Thompson & Warnick, 2007; Thoron & Myers, 2010; Warnick et al. 2004) and inquiry-based instruction (Easterly, III & Myers, 2011; Thoron & Burleson, 2014; Thoron & Myers, 2012b; Thoron & Myers, 2012a), however, some of the participants in this study indicated that integration did not occur in programs they were familiar with.

In this study, the perceived behavioral control was affected by the participants' confidence to integrate science as well as the challenges they think they will have in using the CASE curriculum. For the most part, the participants seemed pretty comfortable with their abilities to integrate science. The participants expressed that participating in this course provided them experience with the activities and taught them strategies that they could use in the future. Through this course the participants received the same training as participants of CASE Institutes. Prior research has shown the positive impact of participation in CASE Institutes (Lambert et al., 2014; Ulmer et al, 2013). The biggest concern that was mentioned by almost every participant had to do with funding. Participants were unsure that schools would support the CASE curriculum because they viewed it as expensive. Participants were not sure if they were allowed to use the curriculum, if they would have the financial support for the needed equipment or supplies. The lack of funding has repeatedly been identified as a barrier to integrating science in agricultural education (Myers & Thompson, 2009; Myers & Washburn, 2008; Thoron & Myers, 2010), using inquiry-based instruction in agricultural education (Washburn & Myers, 2010), and specifically in implementing CASE curriculum (Lambert et al., 2014). Other challenges identified by participants were the length and unclear instructions of some lessons, the lack of academic ability or interest of the secondary students, and that time would not allow them to finish the curriculum in a school year. The concern that they would not be able to teach the entire curriculum is not unwarranted as Lambert et al. (2014) found that teachers were not able to teach the entire curriculum. Therefore, even though participants of this study do feel confident in their abilities to teach the CASE curriculum, they do foresee some challenges. It appears that the financial commitment of the school will be a huge factor for these preservice teachers when they decide whether or not to use the CASE curriculum in the future.

Based on the behavioral beliefs, normative beliefs, and control beliefs (Ajzen, 1991) of the preservice teachers who completed CASE training through a semester long course, it appears that their intentions to use CASE in the future are fairly strong if they are provided the required funding by their school. This conclusion is supported by the participants' responses when asked the likelihood they would use CASE in the future.

Implications/Recommendations

Preservice teachers who received CASE training through a semester long course learned strategies for integrating science into agricultural education, became familiar with CASE, and gained confidence in their ability to integrate science in their classroom. These preservice teachers also became ambassadors for CASE as they talked to agriculture teachers, other university students and professors, family, and friends about CASE and how they were learning to teach agriculture by incorporating science into their instruction. It is recommended that this course continue in the future and that other universities offer similar courses.

Preservice teachers were concerned about the funding issues that are involved with science integration and/or using the CASE curriculum. There are currently grants available to fund CASE training and/or to purchase materials. It is recommended that the teachers of this course make their students aware of these grants. It is also recommended to continue to seek support from industry and individuals to provide more grants or other financial assistance.

Some preservice teachers were nervous to ask a school to provide funding for them to teach CASE their first year of teaching. Other preservice teachers said they were comfortable asking but they wanted to present the benefits of using the curriculum to their school. It is recommended that university professors, who are providing instruction to the preservice teachers, allow the students time at the end of the course to prepare and practice making such presentations. This would make the preservice teachers feel more confident and prepared to ask their new schools for support. Instructors should also explain to preservice teachers to seek assistance from the science teachers at their school. It would be beneficial to provide preservice teachers with strategies for forming a collaborative relationship with science teachers.

It is recommended that this study be replicated at this university in future years and at other universities who have courses that focus on the integration of science into agricultural education. Recommendations for future research include a follow-up study with this same group of students in three to five years to determine how many of the preservice teachers are integrating science into their instruction and/or using CASE curriculum. Another follow up study should look at the ripple effects of these preservice teachers receiving this training and how they have influenced other people. For example seeing if their cooperating teacher, or other people they talked to, started using CASE curriculum.

References

Ajzen, I, (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Carraway, C., Ulmer, J., Street, C., & Barton, M. (2014, May). A new case for CASE. *Poster Session Proceedings: American Association of Agricultural Education Research Conference,* Salt Lake City, UT. Abstract retrieved from http://aaaeonline.org/uploads/allconferences/5-8-2014_148_2014_AAAE_Poster_Proceedings.pdf

Creswell, J.W. (2013). *Qualitative Inquiry & Research Design: Choosing Among Five Approaches*. Thousand Oaks, CA: SAGE.

Curriculum for Agricultural Science Education. (2014a) *CASE program description.* http://www.case4learning.org/about-case/promotional-tools.html.

Curriculum for Agricultural Science Education. (2014b) *Understanding the CASE model.* http://www.case4learning.org/about-case/promotional-tools.html.

Doerfert, D. L. (Ed.) (2011). National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015. Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications.

Easterly, III, R. G. & Myers, B. E. (2011). Inquiry-based instruction for students with special needs in school based agricultural education. *Journal of Agricultural Education, 52*(2), 36-46. doi: 10.5032/jae.2011.02036

Erlandson, D., Harris, E., Skipper, B., & Allen, S. (1993). *Doing Naturalistic Inquiry A Guide to Methods*. Newbury Park, CA: SAGE.

Grady, J. R., Dolan, E. L., & Glasson, G. E. (2010). Agriscience student engagement in scientific inquiry: representations of scientific processes and nature of science. *Journal of Agricultural Education, 51*(4), 10-19. doi: 10.5032/jae.2010.04010

Heintz, M & Retallick, M. (2014, May). The adoption of the CASE curriculum in Iowa. *Poster Session Proceedings: American Association of Agricultural Education Research Conference*, Salt Lake City, UT. Abstract retrieved from http://aaaeonline.org/uploads/allconferences/5-8014_148_2014_AAAE_Poster_Proceedings.pdf

Lambert, M. D., Velez, J. J., & Elliott, K. M. (2014). What are the teachers' experiences when implementing the Curriculum for Agricultural Science Education? *Journal of Agricultural Education, 55*(4), 100-115. doi: 10.5032/jae.2014.04100

Lincoln, Y. S. & Guba, E. G. (1985). *Naturalsitic Inquiry*. Newbury Park, CA: SAGE.

Myers, B. E. & Thompson, G. W. (2009). Perceptions of the National Agriscience Teacher Ambassador Academy toward integrating science into school-based agricultural education curriculum. *Journal of Agricultural Education, 50*(4), 120-133. doi: 10.5032/jae.2009.04120

Myers, B. E. & Washburn, S. G. (2008). Integrating science in the agriculture curriculum: Agriculture teacher perceptions of the opportunities, barriers, and impact on student enrollment. *Journal of Agricultural Education, 49*(2), 27-37. doi: 10.5032/jae.2008.02027

National Council of Teachers of English. (1996). *Standards for the English language arts.* Newark, DL: International Reading Association.

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics.* Reston, VA: Author.

National Research Council. (1996). *National Science Education Standards*. Washington, D. C.: National Academy Press.

Parr, B. & Edwards, M. C. (2004). Inquiry-based instruction in secondary agricultural education: Problem-solving – an old friend revisited. *Journal of Agricultural Education, 45*(4), 106-117. doi: 10.5032/jae.2004.04106

Shoulders, C. W. & Myers, B. E. (2011). An analysis of National Agriscience Teacher Ambassadors' stages of concern regarding inquiry-based instruction. *Journal of Agricultural Education, 52*(2), 58-70. doi: 10.5032/jae.2011.02058

Thompson, G. W. & Warnick, B. K. (2007). Integrating science into the agricultural education curriculum: Do science and agriculture teachers agree? *Journal of Agricultural Education, 48*(3), 1-12. doi: 10.5032/jae.2007.03001

Thoron, A. C. & Burleson, S. E. (2014). Students' perceptions of agriscience when taught through inquiry-based instruction. *Journal of Agricultural Education, 55*(1), 66-75. doi: 10.5032/jae.2014.01066

Thoron, A. C. & Myers, B. E. (2012a). Effects of inquiry-based agriscience instruction and subject matter-based instruction on student argumentation skills. *Journal of Agricultural Education 53*(2), 58-69. doi: 10.5032/jae.2012.02058

Thoron, A. C. & Myers, B. E. (2012b). Effects of inquiry-based agriscience instruction on student scientific reasoning. *Journal of Agricultural Education, 53*(4), 156-170. doi: 10.5032/jae.2012.04156

Thoron, A. C. & Myers, B. E. (2010). Perceptions of preservice teachers toward integrating science into school-based agricultural education curriculum. *Journal of Agricultural Education, 51*(2), 70-80. doi: 10.5032/jae.2010.02070

Thoron, A. C., Myers, B. E., & Abrams, K. (2011). Inquiry-based instruction: How is it utilized, accepted, and assessed in schools with National Agriscience Teacher Ambassadors? *Journal of Agricultural Education, 52*(1), 96-106. doi: 10.5032/jae.2011.01096

Ulmer, J. D., Velez, J. J., Lambert, M. D., Thompson, G. W., Burris, S., & Witt, P. A. (2013). Exploring science teaching efficacy of CASE curriculum teachers: A post-then-pre assessment. *Journal of Agricultural Education*, *54*(4), 121-133. doi: 10.5032/jae.2013.04121

Velez, J. J., Lambert, M. D., & Elliott, K. M. (2012). An examination of the impact of CASE on students. *Proceedings of the National Agricultural Education Research Conference, Asheville, NC, 39*, 34-46.

Warnick, B. K., Thompson, G. W., & Gummer, E. S. (2004). Perceptions of science teachers regarding the integration of science into the agricultural education curriculum. *Journal of Agricultural Education, 45*(1), 62-73. doi: 10.5032/jae.2004.01062

Washburn, S. G. & Myers, B. E. (2010). Agriculture teacher perceptions of preparation to integrate science and their current use of inquiry based learning. *Journal of Agricultural Education*. *51*(1), 88-98. doi:10.5032/jae.2010.01088

Witt, P. A., Ulmer, J. D., Burris, S., Brashears, T., & Burley, H. (2014). A comparison of student engaged time in agriculture instruction. *Journal of Agricultural Education, 55*(2), 16-32. doi: 10.5032/jae.2014.02016

Descriptive Survey Analysis of Student Teacher and Cooperating Teacher Relationships: An Examination of Paired Data

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Abstract

A successful relationship between a student teacher and cooperating teacher plays an important role in fostering the success of preservice teachers as they progress to novice educators (Darling-Hammond & Bransford, 2005). The purpose of this study was to examine the perceptions of the mentoring relationship in a cohort of student teachers and their cooperating teachers. This quantitative portion of a larger mixed-methods examination included the employment of two parallel surveys administered to student and cooperating teachers from Texas A&M University in the spring 2015 semester. Results were examined for student teachers and cooperating teachers separately, and revealed that both groups perceived their relationship to be positive. Both groups yielded high overall ratings in the constructs of student teacher and cooperating teacher factors for successful mentoring. Paired data for sixteen pairs of student/cooperating teachers were also examined. Observed differences in paired data reveal that overall, student teachers and cooperating teacher pairs had similar positive ratings of factors relating to their relationship.

Introduction

One of the most important events in the preparation of preservice teachers is their professional student teaching field experience (Montgomery, 2000; Sudzina, Giebelhaus, & Coolican, 1997). Researchers have determined the relationship between student teachers and their cooperating teacher as paramount in importance to a successful student teaching experience (Edwards & Briers, 2001; Kitchel, 2006; Kitchel & Torres, 2006, 2007; Sudzina, et. al., 1997). In agricultural education, there are many factors related to the interaction between student teachers and cooperating teachers that likely contribute to the success of this experience (Edwards & Briers, 2001; Roberts, 2006). The student/cooperating teacher dynamic has been examined at large in education (Darling-Hammond & Bransford, 2007; Sudzina, et. al., 1997; Zeichner, 2010), and more specifically in agricultural education (Edwards & Briers, 2001; Kitchel, 2006; Kitchel & Torres, 2006, 2007). Although this relationship has been examined from both the student teacher (Anderson, Barksdale, & Hite, 2005; Harlin, Edwards, & Briers, 2002; Knobloch & Whittington, 2002) and cooperating teacher (Deeds, Flowers & Arrington, 1991; Edwards & Briers, 2001; Thobega & Miller, 2007; Young & Edwards, 2005) perspectives, little research has been conducted that allows for a holistic examination of perceptions from matched pairs of student teachers and cooperating teachers.

This study is the quantitative portion of a larger mixed-methods examination of the views of both student teachers and cooperating teachers from Texas A&M University conducted in the spring of 2015. Our goal in this qualitative examination was to conduct a precursory exploration of the perceived relationships between student teachers and their cooperating teachers. To meet this goal, we asked participants to respond to a survey related to their views of both their own interactions and the actions of their student teacher or cooperating teacher. Two parallel survey instruments were created, one administered to student teachers and one administered to cooperating teachers.

Conceptual Framework

The conceptual framework for this study is rooted in Kram's (1985) mentor role theory, along with Ragins and Kram's (2007) outline for successful mentoring relationships. Kram (1985) conducted interviews with mentor/mentee pairs in order to examine the factors that led to a successful interaction. She concluded that several factors in the relationship contributed to increases in the rankings of satisfaction with both mentors and mentees. The factors found to have large amounts of influence were time commitment, willingness to participate, and expectations of the relationship. Kram (1985) concluded that in cases where these factors were favorable, the mentee was more likely to experience success. Ragins and Kram (2007) also examined the important factors of a relationship between mentors and mentees and proposed several areas as determinants of relationship success. Among the identified factors were time commitment, control, and support or encouragement.

By examining the factors identified by Kram (1985) and Ragins and Kram (2007), we may be able to determine the perceptions of the relationship from the view of both student teachers and cooperating teachers. Understanding the perceptions of the relationship from the perspective of both the student teacher and their cooperating teacher is the first step in being able to determine which factors have an impact on the success of a student teaching experience.

A combination of the important factors for successful mentoring derived by both Kram (1985), and Ragins and Kram (2007), resulted in the development of a conceptual framework for this study, shown in Figure 1.

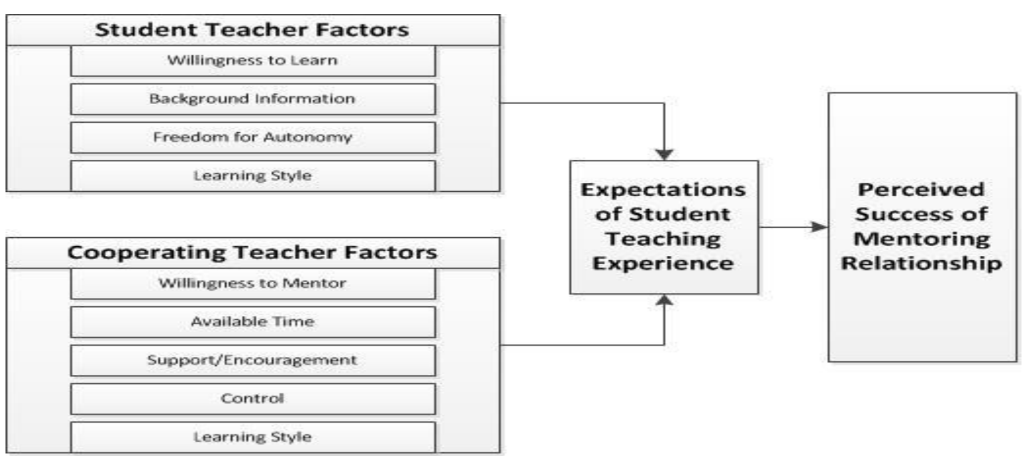

Figure 1. Conceptual Model of Factors Influencing Student Teacher/Cooperating Teacher Relationship

Purpose and Objectives

The purpose of this study was to describe the perceived relationship between student teachers and cooperating teachers. To meet this purpose, the study was conducted using the following guiding objectives:

1. Describe the mentoring relationship as perceived by student teachers.
2. Describe the mentoring relationship as perceived by cooperating teachers
3. Describe the student/cooperating teacher relationship between paired responses from student teachers and their cooperating teachers

Review of Literature

An investigation into the perceived relationship of student and cooperating teachers requires an examination of the importance of the relationship, the factors contributing to the successful interaction, and the outcomes of having a quality mentoring relationship. Both student teachers and cooperating teachers feel their relationship is the most important part of providing a quality student teaching experience (Edwards & Briers, 2001; Harlin, Edwards, & Briers, 2002). Greiman (2002) noted the importance of a quality relationship between mentor and novice teachers in agricultural education. Examining the relationship between student teachers and cooperating teachers who serve as their mentors during student teaching may lead to clarity in how to most effectively pair student teachers with cooperating teachers for a successful interaction (Greiman, 2007; Weasmer & Woods, 2003).

The importance of working toward a successful interaction is well-noted in the body of literature (Darling-Hammond & Bransford, 2007; Sudzina, et. al., 1997; Weasmer & Woods, 2003). Edwards and Briers (2001) conducted a qualitative study to determine the factors that agricultural education cooperating teachers felt were important in developing the successful student teaching relationship. Their findings included the importance of both parties being willing to work together and having well-defined expectations. Roberts (2006) examined factors of cooperating teachers that could increase their effectiveness in mentoring student teachers. His findings suggest that communication plays a large role in successful mentoring relationships. Kitchel and Torres (2006, 2007) studied the role of personality in the relationship between student teachers and cooperating teachers who had been matched based on their Myers-Briggs Type Indicator category. Their findings support the importance of examining relationships as a contributing factor to successful pairing. In addition, researchers have suggested the mentoring ability of the cooperating teacher, willingness of both parties to learn and grow, and the perceived quality of the relationship between student teachers and cooperating teachers as factors which contribute to successful student teaching relationships (Hall, Draper, Smith, & Bullough, 2008; Kram, 1985; Ragins & Kram, 2007; Sudzina, et. al., 1997).

The quality of a student teaching experience has multiple outcomes for agricultural education. It is an important factor in preservice teachers' decisions to join the profession or seek alternative employment (Darling-Hammond & Bransford, 2007; Roberts, Harlin, & Briers, 2009; Tabachnick & Zeichner, 1984). Following the safety net of university preparation programs, the student teaching experience relies on the mentoring ability of high quality inservice teachers who can foster learning in fledgling educators (Darling-Hammond & Bransford, 2007). Successful interactions can lead to an increase in student teacher satisfaction, which will help stimulate confidence and likelihood to teach in preservice educators (Darling-Hammond & Bransford, 2007).

Examining data from pairs of preservice educators and their cooperating teacher has resulted in more specific data about individual interactions. A 2007 study conducted by O'Brian, Stoner, Appel, and House included intensive interviews with seven matched pairs of cooperating teachers and student teachers in a secondary special education setting. Their findings revealed that both student teachers and cooperating teachers felt communication was the most important factor leading to a successful relationship. Grieman (2007) examined the paired relationship between 30 pairs of matched novice teachers and their mentors and found that both groups agreed that they were satisfied with the mentoring relationship. Continued examination of pairs of student teachers and cooperating teachers can help gauge the success of student teaching preparation programs, placement processes, and areas for teacher educators to provide additional support (O'Brian, et. al., 2007).

Methods

This study employed descriptive survey research methods. Spring 2015 agricultural science student teachers from Texas A&M University (n = 20), along with their respective cooperating teachers (n = 20) were the population of this study (N = 40). The student teachers were placed with cooperating teachers for a ten-week experience during the final semester of their four-year degree plan. The student teacher placement process included applications from cooperating teachers to gather information about the program and preferences. The placement process for student teachers included a written statement from the student teacher regarding their strengths and weaknesses as an agricultural educator, and an interview with two teacher educators. Teacher educators collectively discussed and selected a cooperating teacher based on interview responses, cooperating teacher compatibility, and geographic location.

Data collection from student teachers occurred at the end of the final student teaching conference in spring 2015. Student teachers were asked to complete the survey online, using computers provided or their own mobile devices at the conference location. To obtain online survey data from cooperating teachers, Dillman's five points of contact were used (Dillman, Smyth, and Christian, 2014). Prenotification emails were sent, a second contact including a link to the survey followed, and general and personal contact was made with non-responders at three points after sending the initial survey link. The overall response rate for the total population was 80% (N =36), which included responses from all student teachers (n = 20), and (n = 16) of the cooperating teacher group. As objective three of the study included an examination of matched pair data, the data from sixteen pairs (n = 32) of student/cooperating teachers were analyzed.

This study employed two separate researcher-developed survey instruments. One instrument was developed and distributed to student teacher respondents, and a parallel instrument was created for distribution to cooperating teacher respondents. Survey items were created based on the conceptual framework related to mentoring relationships, and included two constructs, items related to student teacher actions, and items related to cooperating teacher actions. Survey items were examined by experts in survey research, teacher educators, and secondary agriculture teachers for content and face validity.

The student teacher survey contained four sections. The first section asked respondents to list their name and the name of their cooperating teacher. The second section was related to their perceptions of their own interactions with the student teacher experience, and began with the prompt “as a student teacher I…” followed by 15 statements for rating on a six-point summated scale from “strongly disagree” to “strongly agree”. The third section of the instrument asked student teachers to respond on the same six-point scale to 30 statements related to the prompt “my cooperating teacher…”. The fourth section of the instrument included seven items to assess the student teacher’s overall perception of their cooperating teacher’s effectiveness. The parallel cooperating teacher survey contained three sections. The sections were identical to the first three sections of the student teacher survey, with the exception of semantic changes to reflect their role as a cooperating teacher.

To establish reliability, a pilot round of data collection was conducted using previous semester student teachers (n = 15) and secondary agricultural science teachers who had previously served as cooperating teachers, but did not have a student teacher in the Spring 2015 semester (n = 13). Reliability for summated-scale items was calculated using Cronbach’s alpha and yielded reliability estimates of $\alpha = 0.91$ and $\alpha = 0.93$ for the constructs of student teacher interaction and cooperating teacher interaction within the student teacher instrument $\alpha = 0.90$ and $\alpha = 0.94$ for the constructs in the cooperating teacher instrument. Post hoc reliability was calculated at $\alpha = 0.89$ and $\alpha = 0.91$ for the two constructs in the student teacher instrument and $\alpha = 0.91$ for both constructs in the cooperating teacher instrument.

To address research objectives one and two, the frequencies and percentages of descriptive categories were analyzed using IBM SPSS version 20. To address research objective three, difference scores between each student teacher and their coordinating student teacher were calculated, to determine a grand mean of the differences for each survey item.

Several assumptions were considered within the parameters of this study. As such, no data was collected on the validity of these factors and data were considered to be accurate in light of these assumptions. The assumptions included that survey respondents were student teachers or cooperating teachers from Texas A&M University in the spring of 2015, and responses to survey items were truthful. Although every attempt was made to accommodate potential limitations to the findings of this study, certain limitations exist. First, the small population limits the generalizability of this study. Caution should been taken when using this data to infer to populations outside of the scope of the population in this study, especially as widespread differences in student teacher placement processes exist. Second, it is important to note that the purposively selected cooperating teachers in this group are not representative of all agricultural educators.

Findings

To understand the perceptions of the student teacher and cooperating teacher relationship, we first examined their responses to the instrument items related to their perceptions of their own interactions within the student teaching. The grand mean for student teacher responses in this category was *M* = 5.23 (SD = 0.45). Mean responses for all items in this area were above a 4.0 on the six-point scale, indicating student teachers' overall positive perception of their interactions in the student teaching experience.

Comparative responses were relatively similar for the group with the exception of the prompts "kept issues to myself when I was struggling", "did not reach out to my cooperating teacher when I was having a teaching challenge", and "only needed to hear advice once to implement positive changes". Complete results for student teacher responses to items within the student teacher construct are shown in Table 1.

Table 1
Student Teacher Responses to Items in Student Teaching Construct (*n* = 20)

Item	*Min*	*Max*	*M*	*SD*
Actively sought opportunities to receive feedback	4	6	5.35	0.59
Asked my cooperating teacher when I was struggling with a teaching-related question	4	6	5.15	0.59
Did not reach out to my cooperating teacher when I was having a teaching challenge*	1	6	4.85	1.23
Had a desire to hone my skills as an educator	3	6	5.25	0.91
Indicated to my cooperating teacher that I wanted to improve my teaching skills	4	6	5.10	0.72
Kept issues to myself when I was struggling*	1	6	4.20	1.15
Made noticeable progress over the course of my student teaching	4	6	5.55	0.61
Often stayed outside of contract hours to complete student teaching responsibilities	5	6	5.45	0.51
Only needed to hear advice once to implement positive changes	2	6	4.30	1.26
Put in the hours to complete student teaching successfully	4	6	5.50	0.69
Understand how much time being a quality agricultural science teacher requires	4	6	5.50	0.61
Used suggestions for improvement to increase my skills as an educator	5	6	5.45	0.51
Valued the advice of my cooperating teacher	4	6	5.55	0.61
Was committed to spending the necessary time to be a quality agricultural science teacher	4	6	5.55	0.61
Was open to constructive criticism	4	6	5.65	0.59
Grand Mean			5.23	0.45

Note. Anchors for responses were 1= strongly disagree, 2= disagree, 3= somewhat disagree, 4= somewhat agree, 5= agree, 6= strongly agree.
* indicates reverse coded items

To understand the perceptions of student teachers regarding their cooperating teachers' role in the mentoring relationship, the means for the 30 items related to the prompt "my cooperating teacher…" were calculated. The standard deviations for responses to these items was greater than responses in the student teacher construct, although the overall grand mean (*M* = 4.83 SD = 0.38) indicated that the student teacher perceptions of their cooperating teachers was positive overall. The item in this construct showing the most favorable perception was "my cooperating teacher gave me opportunities to work with students on my own" (*M* = 5.70 SD = 0.57), while the item having the lowest rating was a reverse-coded statement "maintained control over their classes, even though I was teaching" (*M* = 3.20 SD = 1.32). Complete data for student teacher ratings on cooperating teacher construct items is shown in Table 2.

Table 2
Student Teacher Responses to Items in Cooperating Teacher Construct (*n* = 20)

Item	*Min*	*Max*	*M*	*SD*
Accepts me as a competent professional	4	6	5.30	0.87
Believes my success is a reflection of their abilities as a mentor	1	6	4.50	1.36
Cared about my success as a student teacher	2	6	5.60	0.94
Challenged me to push myself as an educator	3	6	4.80	0.83
Did not allow me to deviate from their own teaching materials*	1	6	4.85	1.39
Did not give me enough backup when dealing with difficult students*	1	6	4.80	1.24
Explained teaching concepts in a way that was difficult for me to understand*	1	6	3.85	1.76
Gave me advice on a daily basis	2	6	4.70	1.22
Gave me opportunities to work with students on my own	4	6	5.70	0.57
Gave me suggestions for improvement in a way that allowed me to understand how to make changes	2	6	4.90	0.91
Gave me the freedom to teach the courses I was assigned with my own concepts for instruction	4	6	5.50	0.69
Held regular conferences with me to discuss my progress	1	6	4.00	1.59
Helped me learn more about the daily tasks associated with being an agricultural science teacher	4	6	5.45	0.69
Is someone I look up to	2	6	5.30	1.03
Listened to my problems	3	6	5.05	1.00
Made me feel like they supported my teaching decisions	2	6	5.00	1.26
Made time in their schedule to answer my questions	3	6	4.95	1.10
Maintained control over their classes, even though I was teaching*	1	6	3.20	1.32
Provided no clear direction of how I should approach problems in my teaching*	3	6	4.70	0.98
Provided opportunities for me to experience the teacher responsibilities associated with a complete agricultural education program (Class & Lab, FFA, SAE)	3	6	5.10	0.97
Represents the kind of agricultural science teacher I would like to be	1	6	4.85	1.31
Saw being my cooperating teacher as unimportant to their career*	1	6	5.10	1.29
Shared experiences that would allow me to progress as an	2	6	5.10	1.02

agricultural science teacher				
Spent time with me outside of contract hours to help me become a better teacher	2	6	4.90	1.17
Stepped in too often when I was struggling with students*	2	6	4.45	1.23
Took pride in my teaching abilities	2	6	5.05	1.15
Was easy to talk to	4	6	5.35	0.75
Was too busy with their teaching duties to meet with me on a regular basis*	1	6	4.20	1.44
Watched the lessons I taught more often than required for documentation	1	6	4.15	1.50
Would often perform agricultural science teacher duties without inviting me along*	2	6	4.55	1.40
Grand Mean			4.83	0.38

Note. Anchors for responses were 1= strongly disagree, 2= disagree, 3= somewhat disagree, 4= somewhat agree, 5= agree, 6= strongly agree.
* indicates reverse coded items

The student teachers also ranked their perceptions of the overall effectiveness of their cooperating teacher in seven different areas, as shown in Table 3. Student teachers showed a highly positive rating of their collective cooperating teachers' abilities with a grand mean of M = 5.19 (SD = 0.16)

Table 3
Student Teacher Responses to Items Related to Cooperating Teacher Effectiveness (n = 20)

Item	*Min*	*Max*	*M*	*SD*
Ability to share their knowledge of educational practices	4	6	5.11	0.81
Ability to share their knowledge of being a successful FFA advisor	4	6	5.21	0.71
Ability to share their content knowledge on agricultural topics	4	6	5.21	0.71
Ability to communicate with me in a way that was constructive	4	6	5.16	0.83
Ability to communication with me in a way that fostered my belief in my own abilities	2	6	5.11	0.99
Willingness to help me develop as an educator	1	6	5.25	1.16
Commitment to my personal development	1	6	5.05	1.22
Grand Mean			5.19	0.16

Note. Anchors for responses were 1= very ineffective, 2= ineffective, 3= somewhat ineffective, 4= somewhat effective, 5= effective, 6= very effective.

To describe the perceptions of cooperating teachers related to the relationship between student teachers and cooperating teachers, respondents answered questions related to their view of student teacher interactions during the experience. The mean responses to items in this area indicate that as a whole the cooperating teachers in this group have a positive perception of their student teachers' interactions in the student teaching experience. Cooperating teachers most agreed with the statement that the student teacher they worked with "had a desire to hone their skills as an educator" (M = 5.38, SD = 0.89).

Table 4
Cooperating Teacher Responses to Items in Student Teaching Construct (*n* = 16)

Item	*Min*	*Max*	*M*	*SD*
Actively sought opportunities to receive feedback	2	6	4.94	1.12
Asked me questions when they were struggling with a teaching-related question	2	6	5.13	1.15
Did not reach out to me when they were having a teaching challenge*	1	6	4.19	1.91
Had a desire to hone their skills as an educator	3	6	5.38	0.89
Indicated to me that they wanted to improve their teaching skills	2	6	4.94	1.12
Kept issues to themselves when they were struggling*	1	6	4.44	1.26
Made noticeable progress over the course of their student teaching	4	6	5.50	0.63
Often stayed outside of contract hours to complete student teaching responsibilities	3	6	5.31	1.01
Only needed to hear advice once to implement positive changes	3	6	5.19	0.91
Put in the hours to complete student teaching successfully	3	6	5.44	0.89
Understood how much time being a quality agricultural science teacher requires	2	6	5.25	1.24
Used suggestions for improvement to develop their skills as an educator	4	6	5.12	0.81
Valued my advice	4	6	5.44	0.89
Was committed to spending the necessary time to be a quality agricultural science teacher	4	6	5.37	0.81
Was open to constructive criticism	1	6	5.19	1.28
Grand Mean			5.10	0.30

Note. Anchors for responses were 1= strongly disagree, 2= disagree, 3= somewhat disagree, 4= somewhat agree, 5= agree, 6= strongly agree.
* indicates reverse coded items

To examine the perceptions of cooperating teachers related to their own interactions in the student teaching experience, they rated their level of agreement to 30 statements. Like the student teachers, the cooperating teachers had overall positive levels of agreement with their interactions in the student teaching experience, with a grand mean for items in this construct of (M = 5.03 SD = 0.61). Cooperating teacher responses for all questions in this construct are shown in Table 5.

Table 5
Cooperating Teacher Responses to Items in Student Teacher Construct (*n* = 16)

Item	*Min*	*Max*	*M*	*SD*
Accept the student teacher as a competent professional	5	6	5.56	0.51
Believe the student teacher's success is a reflection of my ability as a mentor	2	6	4.56	1.03
Cared about the success of the student teacher	5	6	5.81	0.40
Challenged the student teacher to push them self as an educator	4	6	4.88	0.62
Discouraged the student teacher from deviating from my teaching	2	6	5.12	1.15

materials*				
Provided backup when the student teacher was dealing with difficult students	3	6	5.13	1.03
Tried to explained teaching concepts but felt the student teacher did not always understand*	1	6	4.25	1.88
Gave advice on a daily basis	2	6	4.5	1.37
Gave the student teacher opportunities to work with students on their own	4	6	5.50	0.73
Gave suggestions for improvement in a way that the student teacher could understand how to make changes	4	6	5.00	0.73
Gave the student teacher freedom to teach the courses they were assigned with their own concepts for instruction	4	6	5.44	0.73
Held regular conferences with the student teacher to discuss their progress	2	6	4.38	1.26
Helped the student teacher learn more about the daily tasks associated with being an agricultural science teacher	3	6	5.31	0.87
Tried to be someone they could look up to	5	6	5.50	0.52
Listened to the student teacher's problems	2	6	5.31	1.08
Supported the student teacher's 5teaching decisions	5	6	5.50	0.52
Made time in my schedule to answer their questions	2	6	5.06	1.18
Maintained control over my classes*	1	5	4.31	1.35
Wanted the student teacher to try and find their own solutions in their teaching struggles	4	6	4.94	0.85
Provided opportunities for the student teacher to experience the teacher responsibilities associated with a complete agricultural education program (Class & Lab, FFA, SAE)	5	6	5.81	0.40
Tried to model the behaviors of a successful agricultural educator	5	6	5.44	0.51
See being a cooperating teacher as important to my career	3	6	5.12	1.03
Shared my past experiences that would allow the student teacher to progress as an agricultural science teacher	5	6	5.63	0.50
Spent time with me outside of contract hours to help student teacher become a better teacher	2	6	5.00	1.03
Stepped in to help when the student teacher was struggling with students	2	6	4.50	1.21
Took pride in the student teacher's teaching abilities	4	6	5.44	0.63
Tried to be approachable to the student teacher	4	6	5.50	0.73
Was busy with my teaching duties and did not meet with the student teacher on a regular basis*	1	6	4.25	1.95
Watched the lessons the student teacher taught more often than required for documentation	4	6	5.31	0.70
Occasionally performed agricultural science teacher duties without inviting the student teacher along*	1	5	3.69	1.35
Grand Mean			5.03	0.61

Note. Anchors for responses were 1= strongly disagree, 2= disagree, 3= somewhat disagree, 4= somewhat agree, 5= agree, 6= strongly agree.

* indicates reverse coded items

To determine the differences in paired perceptions between student teachers and their cooperating teacher, the data from the cooperating teachers completing the survey (n = 16) were matched to the respective student teacher data (n = 16) and a difference score for each of the paired survey items was calculated by taking the absolute value between student teacher and cooperating teacher rating for each item. The total difference scores for each pair were averaged for each of the constructs. In the student teaching construct, differences in matched pairs was M = 0.87, SD = 0.42. For the cooperating teacher construct calculated difference between matched pairs yielded M = 0.91 SD = 0.27. When differences were analyzed between matched pairs for the entire instrument, it was determined that pairs had a mean difference on all 45 items of M = 0.82 (SD = 0.31). It is important to note that variations existed between the difference scores for individual pairs; the pair with the lowest total difference in ratings for all 45 instrument items was 21 scale points, while the pair with the highest difference score showed 74 scale points of difference among all items.

Table 6
Observed Differences in Rating Scores for Matched Pairs of Student Teachers and Cooperating Teachers by Construct (n = 16)

Construct	*Min*	*Max*	*M*	*SD*
Student Teacher Construct	0.40	1.87	0.87	0.42
Cooperating Teacher Construct	0.50	1.53	0.91	0.27
Complete Instrument	0.47	1.64	0.90	0.31

Note. Difference scores were obtained by calculating the absolute value between matched student teacher and cooperating teacher scale scores on each item then calculating the mean score on all difference scores within a construct.

Conclusions and Implications

This examination of the perceptions of relationships between student teachers and cooperating teachers allows us to conclude that both groups were highly satisfied with the mentoring relationship. Differences which existed between the student teacher and cooperating teacher groups give insight into factors to include in the student teacher placement process, and an examination of the paired data highlights the need to continue to view relationships as an individual dynamic.

Student teachers responded positively to items related to receiving constructive criticism, highly valued advice from their cooperating teacher, were commitment to being a quality teacher, and felt they made noted progress over the semester long teaching experience. On whole the student teachers perceived their cooperating teacher as an asset to the process of becoming a more effective teacher. Teacher educators should consider placements with cooperating teachers who are comfortable providing both positive and negative feedback, as student teachers showed a strong desire for constructive criticism. Low response scores on the item for heeding advice the first time could note the need to incorporate training for student teachers related to reflecting on advice during the university preparation.

Student teachers responded overwhelmingly that they were allowed to work one on one with students (M = 5.70, SD = 0.57). They also expressed a strong desire to have the freedom to select appropriate methods of instruction for given courses, and reported a high confidence in the idea that their cooperating teacher cared for their success as a teacher. These results indicate that student teachers were given autonomy for developing their courses and working with students in a setting similar to their first year of teaching. Teacher educators can use this information to help make placements where student teachers will be encouraged to find their own style of teaching.

This group of student teachers perceived their cooperating teachers as being willing to help them develop as an effective teacher and as someone who could effectively share knowledge about aspects of a complete program. The student teachers agreed with their cooperating teachers' effectiveness in their role. From a program evaluation standpoint, the student teachers' assessment of the overall effectiveness of their cooperating teachers is evidence of strong mentor teachers in this cohort group. We recommend continuing to use student teacher feedback related to the merits of cooperating teachers in future cooperating teacher selections.

When asked, cooperating teachers reported that the student teachers had a strong desire to hone their skills as educators. This is consistent with the student teachers reported desires to do the same. Cooperating teachers also conveyed that the student teachers were committed to spending the necessary time to become quality agricultural science teachers, and felt as though the student teachers did progress noticeably over the course of the experience in a positive manner. Their positive response to student teacher effort lends support for strong education about the requirements of being an agricultural educator in preservice teaching courses.

Cooperating teachers reported being able to effectively share the responsibility associated with a complete agricultural education program, and the ability to relate real life experiences from their past to student teachers. The perceived deficiencies were in the cooperating teachers' ability to hold regular conferences to discuss the student teachers progress and give advice daily. Both of these perceived deficiencies relate to the lack of time. A successful mentoring relationship is dependent on adequate time (Kram, 1985; Ragins & Kram, 2007). Due to the concerns expressed about lack of adequate time for mentoring, we recommend continued research into methods for increasing quality of mentoring without encroaching on cooperating teachers' already limited time.

The success of the student teaching experience rests in the hands of the student teachers who undertake the experience and the cooperating teachers who they are entrusted too. Both groups felt as though effort and expectations played a role in the success of the relationship. We recommend further research into the areas of dedication, methods of feedback, and how to openly communicate challenges in the student teaching experience. As teacher educators make the decision related to the first formal mentoring relationship of student teachers with their inservice colleagues, the importance of the student/cooperating teacher relationship is one that cannot be overlooked.

References

Anderson, N. A., Barksdale, M. A., & Hite, C. E. (2005). Preservice teachers' observations of cooperating teachers and peers while participating in an early field experience. *Teacher Education Quarterly*, 97-117.

Darling-Hammond, L., & Bransford, J. (Eds.). (2007). *Preparing teachers for a changing world: What teachers should learn and be able to do*. John Wiley & Sons.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: the tailored design method*. Hoboken, NJ: John Wiley & Sons.

Edwards, M. C., & Briers, G. E. (2001). Cooperating teachers' perceptions of important elements of the student teaching experience: A focus group approach with quantitative follow-up. *Journal of Agricultural Education*, *42*(3), 31-42.

Greiman, B. C. (2014). Influence Of Mentoring On Dyad Satisfaction: Is There Agreement Between Matched Pairs of Novice Teachers And Their Formal Mentors?. *Journal of Career and Technical Education*, *23*(1).

Hall, K. M., Draper, R. J., Smith, L. K., & Bullough Jr, R. V. (2008). More than a place to teach: Exploring the perceptions of the roles and responsibilities of mentor teachers. *Mentoring & Tutoring: Partnership in Learning*, *16*(3), 328-345.

Harlin, J. F., Edwards, M. C., & Briers, G. E. (2002). A comparison of student teachers' perceptions of important elements of the student teaching experience before and after an 11 week field experience. *Journal of Agricultural Education*, *43*(3), 72-83.

Kitchel, T. (2006). Perceived differences, by gender, in student teacher-cooperating teacher interactions. *Journal of Southern Agricultural Education Research, 56*(1), 62-75.

Kitchel, T., & Torres, R. M. (2006). The influence of personality type on the extent cooperating teachers provide psychosocial influence to student teachers. *Journal of Agricultural Education*, *47*(4), 134-144.

Kitchel, T., & Torres, R. M. (2007). Possible Factors in Matching Student Teachers with Cooperating Teachers. *Journal of Agricultural Education*, *48*(3), 13-24.

Knobloch, N. A., & Whittington, M. S. (2002). Novice teachers' perspectives of support, teacher preparation quality, and student teaching experience related to teacher efficacy. Journal of Vocational Education Research, 27, 331–341.

McGhee, M. B., & Cheek, J. G. (1990). Assessment of the preparation and career patterns of agricultural education graduates, 1975-1985. *Journal of Agricultural Education*, *31*(2), 17-22.

Montgomery, B. (2000). The student and cooperating teacher relationship. *Journal of Family and Consumer Sciences Education*, *18*(2), 7-15.

O'Brian, M., Stoner, J., Appel, K., & House, J. J. (2007). The first field experience: Perspectives of preservice and cooperating teachers. *Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children*, *30*(4), 264-275.

Ragins, B. R., & Kram, K. E. (2007). *The handbook of mentoring at work: Theory, research, and practice*. Thousand Oaks, CA: Sage.

Roberts, T. G. (2006). Developing a model of cooperating teacher effectiveness. *Journal of Agricultural Education*, *47*(3), 1.

Roberts, T. G., Harlin, J. F., & Briers, G. E. (2009). Predicting Agricultural Education Student Teachers' Intention to Enter Teaching. *Journal of Agricultural Education*, *50*(3), 56-68.

Sudzina, M., Giebelhaus, C., & Coolican, M. (1997). Mentor or tormentor: The role of the cooperating teacher in student teacher success or failure. *Action in Teacher Education*, *18*(4), 23-35.

Tabacbnick, B. R., & Zeichner, K. M. (1984). The impact of the student teaching experience on the development of teacher perspectives. *Journal of teacher education*, *35*(6), 28-36.

Weasmer, J., & Woods, A. M. (2003). The role of the host teacher in the student teaching experience. *The Clearing House*, *76*(4), 174-177.

Zeichner, K. (2010). Rethinking the connections between campus courses and field experiences in college-and university-based teacher education. *Journal of Teacher Education*, *61*(1-2), 89-99.

The Relationship Status is Complicated: A Qualitative Examination of Thoughts on the Student Teacher \ Cooperating Teacher Relationship from Both Perspectives

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Abstract

A successful relationship between a student teacher and their cooperating teacher plays an important role in their development as educators (Darling-Hammond & Bransford, 2005). Examining the dynamics between student teachers and the cooperating teachers who mentor them could provide valuable information for teacher preparation programs and preservice teachers. This qualitative examination included semi-structured interviews with four secondary agricultural educators who had served as cooperating teachers, and a focus group of n = 18 preservice agricultural educators who had recently completed their student teaching experience. Through an analysis of the collected data, we determined that cooperating teachers find communication, gender, and effort to be factors in the relationship. Student teachers felt that it was important for a cooperating teacher to allow freedom of development, integrate them into an established culture, and serve as a reflection of their future self. When asked about placement decisions, both groups agreed that placing student teachers in programs matching their expectations and abilities and with cooperating teachers who had similar personalities would yield the potential for the most successful relationship.

Introduction

One of the most important events in the preparation of preservice teachers is their professional student teaching field experience (Montgomery, 2000; Sudzina, Giebelhaus, & Coolican, 1997). Researchers have determined the relationship between student teachers and their cooperating teacher as paramount in importance to a successful student teaching interaction (Edwards & Briers, 2001; Kitchel, 2006; Kitchel & Torres, 2006, 2007; Sudzina, et. al., 1997). In agricultural education, there are many student teacher and cooperating teacher factors related to the interaction between student teachers and cooperating teachers that likely contribute to the success of this experience (Edwards & Briers, 2001; Roberts, 2006).

The student/cooperating teacher dynamic has been examined at large in education (Darling-Hammond & Bransford, 2007; Sudzina, et. al., 1997; Zeichner, 2010), and more specifically in agricultural education (Edwards & Briers, 2001; Kitchel, 2006; Kitchel & Torres, 2006, 2007). Although this relationship has been examined from both the student teacher (Anderson, Barksdale, & Hite, 2005; Harlin, Edwards, & Briers, 2002; Knobloch & Whittington, 2002) and cooperating teacher (Edwards & Briers, 2001) perspectives, little research has been conducted that allows for a holistic examination of perceptions from both groups.

This study is the qualitative portion of a larger mixed-methods examination of the views of both student teachers and cooperating teachers from Texas A&M University conducted in the spring of 2015. Our goal in this portion of the study was to conduct a precursory exploration of the perceived relationships between student teachers and cooperating teachers. To meet this goal, we conducted interviews with four cooperating teachers and a focus group of eighteen student teachers who had recently completed their student teaching experience.

Conceptual Lens

The conceptual lens through which we approached this study was rooted in Kram's (1985) mentor role theory, along with Ragins and McFarlin's (1990) outline for successful mentoring relationships. Kram (1985) conducted interviews with mentor/mentee pairs in order to examine the factors that led to a successful interaction. She identified several functions of the relationship that led to increases in the rankings of satisfaction with both mentors and mentees, including time commitment, willingness to participate, and expectations of the relationship. She concluded that in cases where these factors were favorable, the mentee was more likely to experience success.

Ragins and McFarlin (1990) examined the important factors of a relationship between mentors and mentees and proposed several areas as determinants of relationship success, among those factors were time commitment, control, and support or encouragement. By examining these factors, researchers may be able to determine the perceptions of the relationship from the view of both student teachers and cooperating teachers.

A combination of the important factors for successful mentoring derived by both Kram (1985), and Ragins and McFarlin (1990), guided the development of our research protocol, and allowed us to ask questions through the data collection related to these theories.

Purpose and Objectives

The purpose of this study was to describe the perceptions of the relationship between student teachers and cooperating teachers. To meet this purpose, the qualitative data collection was guided by the following research questions:

1. What factors do student teachers find important in their relationship with cooperating teachers?
2. What factors do cooperating teachers find important in their relationship with student teachers?
3. What suggestions do student teachers and cooperating teachers have for improving the placement process to increase the success of mentoring relationships?

Review of Literature

The quality of a student teaching experience has been shown to be a large factor in a preservice teacher's decision to join the profession or seek alternative employment (Darling-Hammond & Bransford, 2007; Roberts, Harlin, & Briers, 2009; Tabachnick & Zeichner, 1984). Following the safety net of university preparation programs, the student teaching experience relies on the mentoring ability of high quality inservice teachers who can foster learning in fledgling educators (Darling-Hammond & Bransford, 2007). There are several factors that play a role in the successful interaction between a student teacher and cooperating teacher, including the mentoring ability of the cooperating teacher, willingness to learn and grow from the student teacher, and the quality of the relationship between them (Hall, Draper, Smith, & Bullough, 2008; Sudzina, et. al., 1997).

The importance of working toward a successful interaction is well-noted in the body of literature (Darling-Hammond & Bransford, 2007; Sudzina, et. al., 1997; Weasmer & Woods, 2003). Edwards and Briers (2001) conducted a qualitative study to determine the factors that agricultural education cooperating teachers felt were important in developing the successful student teaching relationship. Among their findings was the importance of both parties being willing to work together and having well-defined expectations. Roberts (2006) examined factors of cooperating teachers that could increase their effectiveness in mentoring student teachers. His findings suggest that communication plays a large role in successful mentoring relationships.

In the literature, both student teachers and cooperating teachers have expressed that they feel their relationship is the most important part of providing a quality student teaching experience (Edwards & Briers, 2001; Harlin, Edwards, & Briers, 2002). Greiman (2002) noted the importance of a quality relationships between mentor and novice teachers in agricultural education. Examining the relationship between student teachers and cooperating teachers who serve as their mentors during student teaching may lead to clarity in how to most effectively pair student teachers with cooperating teachers (Greiman, 2007; Weasmer & Woods, 2003).

The outlook of agricultural education student teachers on their experience has been found to be positive overall. The findings of Harlin, et. al. (2002) and Whittington, McConnell, and Knobloch (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.

Kitchel and Torres (2006, 2007) studied the role that personality played in the relationship between student teachers and cooperating teachers who had been matched based on their Myers-Briggs Type Indicator category. Their findings support the importance of examining relationships as a contributing factor to successful pairing of student and cooperating teachers.

A 2007 study conducted by O’Brian, Stoner, Appel, and House included conducting ongoing and intensive interviews with seven matched pairs of cooperating teachers and student teachers in a secondary special education setting. Their findings revealed that both student teachers and cooperating teachers felt communication was the most important factor leading to a successful relationship. Grieman (2007) examined the paired relationship between 30 pairs of matched novice teachers and their mentors and found that both groups agreed that they were satisfied with the mentoring relationship.

Methods

This study employed qualitative research methods. We used data collection methods including semi-structured interviews and a focus group following Spradley's (1979) guidelines to obtain information related to research questions. Lincoln and Guba (1985) set forth the conditions for establishing trustworthiness in ethnographic research. To establish trustworthiness, we addressed the factors of credibility, transferability, dependability, and confirmability.

Credibility was established through the use of peer debriefing and member checking, following the guidelines of Lincoln and Guba (1985), and triangulation of data (Creswell, 2012; Yin, 2010). To meet the condition of transferability, we employed field notes and collected ancillary information as descriptive data related to study participants (Denzin & Lincoln, 2008). Dependability and confirmability were established by maintaining an audit trail for reference of all coded data to raw sources (Lincoln & Guba, 1985)

Subjects for the interview portion of this study included four secondary agricultural science teachers, three of whom were currently serving as cooperating teachers for agricultural science student teachers, and one who had a longstanding record of service as a cooperating teacher for agricultural science student teachers from Texas A&M University (but who did not have a student teacher in the Spring 2015 semester). Teachers were purposively selected based on their level of interaction with student teachers. Two of the teachers interviewed had more than ten years of experience with student teachers, the others had only mentored two or three student teachers during their career.

Each interview was conducted at the teaching site for each of the cooperating teachers, with pre-arranged interviews scheduled for 60 minutes. Actual interviews lasted from 55 to 75 minutes. We took field notes of the interviews and transcribed the field notes immediately after the interview for each of the four interviews following the guidelines of Yin (2010). Reflexive journaling was also used to collect and identify potential researcher bias (Lincoln & Guba, 1985; Denzin & Guba, 2008). Merriam (1988) established that data analysis coexists with data collection in qualitative research. The use of analytical and reflexive field notes in coding initial information as collected served as the initial data analysis procedure for interview data collection.

Subjects in the focus group were n = 18 of the spring 2015 student teachers in agricultural education at Texas A&M University. The focus group was conducted by graduate student who had worked with the student teachers for the two semesters prior to their student teaching experience. The decision to have a familiar moderator was made to allow the student teachers to feel comfortable enough to speak truthfully about their experience, without concerns about their comments affecting their standing with university faculty, who have more interaction with cooperating teachers. Having moderators with established rapport with focus group participants is important in collecting unbiased opinions (Spradley, 1979). To obtain participants, voluntary participation was solicited from the total population of spring 2015 agricultural science student teachers N = 20. Student teachers were sent an email to make them aware of the opportunity to participate in the focus group, which was held directly following their end-of-semester student teaching conference. The focus group was audio recorded, and we took field notes during the focus group for subsequent analysis. We transcribed the focus group audio file, and two separate researchers analyzed the transcripts and field notes to identify emergent themes.

Procedures for content analysis, as set forth by Lincoln and Guba (1985), were used to analyze the data collected in the transcripts from interviews and the focus group. Triangulation of findings between the research team was completed per the recommendation of Creswell (2012). One of our team members was responsible for the primary data analysis of the interviews, and another member of the team was responsible for the primary focus group data analysis. We used peer debriefing with university faculty members and agriculture teachers in Texas to assist in clarifying the primary data analysis including our interpretations for both portions of this study, utilizing Creswell's (2012) methods of peer debriefing. In addition, member checking completed following analysis with the respective groups to allow for further clarification of interpretations, and identification of potential researcher bias.

While the nature of qualitative research prohibits the ability to generalize findings to a population outside of the study, transferability to similar cases is possible (Lincoln & Guba, 1985). Several areas should be mentioned when discussing the transferability of this study. Of particular note are the varied experiences and program focus of the cooperating teachers in the interview portion of this study, and the fact that the nature of focus groups does not always allow all members to feel comfortable sharing opinions (Yin, 2010). Both of those factors should be considered when transferring these findings to other groups.

Subject Characteristics

Stephanie (pseudonym)

Ms. Stephanie Glause was the agricultural science teacher at Cleary High School in Cleary, Texas. Cleary is in a larger rural town, about 30 minutes from the closest major city. There are approximately 550 students in grades 9-12, around 200 of which are enrolled in the agricultural education program. The agricultural education program at Cleary has three teachers. Ms. Glause was in her 20th year teaching high school agriculture courses. She had more than 15 years of serving as a cooperating teacher, and estimated she had mentored approximately 20 student teachers. She was teaching animal science, an introduction to agriculture course, floral design, advanced animal science, and an agricultural leadership course. The other instructors teach agricultural systems classes and principles of agriculture, food, and natural resources. Stephanie originally started teaching at a school in a larger town and made the move to Cleary High School three years prior to the interview. Cleary is the school that she graduated from, and she was teaching with one of her former high school agriculture teachers. Ms. Glause shared that the mission of the program at Cleary High was to have a well-rounded overall program, with equal emphasis on FFA, SAE, and classroom instruction. She stressed that they try to have no one area of the program overshadow the others.

Shelby (pseudonym)

Ms. Shelby Bigelow-Mason taught at Johnson High School in Johnson, Texas. This school was in a rural community drawing students from approximately a 15 mile radius. The Johnson secondary school campus had 350 students in grades 6-12, more than 200 of which were enrolled in the agricultural education program. Ms. Bigelow-Mason, who mentioned that she now often goes simply by Ms. Mason, has been teaching for eight years, the first two years in a larger urban school and the last six at Johnson High School. She had two teaching partners, one of which is her husband. Ms. Mason taught nine different classes throughout the day, even doubling up and teaching more than one subject per period if necessary to maintain the enrollment in the program. When asked what the focus of the program was, Shelby said the program focused mainly on developing leadership skills, noting that they had a very active FFA chapter and have had success with leadership-based Career Development Events (CDEs).

James (pseudonym)

James Ford, was a male agricultural science teacher who was completing his third year of teaching experience. He was teaching at Adams High School in Adams, Texas. Adams had approximately 500 students 9-12 and nearly 300 of them were involved in the agricultural education program. James was teaching animal science, introduction to agriculture, agricultural communications, and an introductory agricultural mechanics course. He grew up with strong involvement in agricultural education and was excited for the opportunity to serve agricultural education in any way possible, noting his desire to give back as a large factor leading to his decision to be an agriculture science teacher. His program was in a rural setting, and he taught at a school where agricultural education and FFA were seen very favorably from both the community and the students. He mentioned that his primary focus was to be a quality classroom teacher first, and then to be a good FFA advisor.

Madison (pseudonym)

Ms. Madison Matthews taught at Collins High School in a large school (2700 students) in a suburban city in Texas. Her course load included teaching floral design, introduction to agriculture, and agricultural communication. She described her own high school agricultural education experience as “mediocre” and said that she was inspired through her experience to be the kind of agriculture teacher that she didn’t have. In explaining her current program, she said that they were “crazy involved” in all aspects of the program. She mentioned that she and her two teaching partners trained more than ten CDE teams, attended many stock shows, and were held to high standards for classroom performance by their large school district. She mentioned that she knew she tried to take on too much responsibility for the success of the program and hoped to be able to “find a balance” between home and school life.

Focus Group

The student teacher focus group was made up of n = 18 student teachers on the last day of their student teaching experience. These student teachers ranged in age from 21 to 26, and the focus group included five male and thirteen females. Student teachers came from varied backgrounds, with some growing up in very rural towns and having complete integration in an agricultural program, including one student teacher whose father is a current agriculture teacher. Other student teachers in the focus group came from large urban areas and had no previous agricultural education experience prior to their enrollment in an agricultural education degree program. Student teachers had been placed in programs ranging from very urban to very rural, with cooperating teachers from many different backgrounds.

Findings

Research Question One: What factors do student teachers find important in their relationship with cooperating teachers?

"Who you have as a cooperating teacher has a massive impact on whether you have a positive or negative experience," was a sentiment expressed in the focus group by Participant-17. His comments were echoed throughout the focus group data as student teachers explained the relationship with their cooperating teachers. Freedom to develop as an individual teacher, integration with an established culture, and similarity with their cooperating teacher were concepts emerging related to student teacher impressions of their relationship with their cooperating teachers. This group was open to discussing their suggestions for what did and did not work in the confines of their student teaching experience.

Student teachers developed an intense feeling toward their freedom to develop their own teaching style. Their desire for a delicate balance between the two was stated most eloquently by Participant-1 who said, "She [the cooperating teacher] let me be a free spirit…She has 25 years of experience teaching but let me find my own way." Collectively, the group felt as though there was vast importance in the way their cooperating teacher allowed them to actively experiment with different teaching strategies. Their relief when in this type of environment was stated by Participant-9 who noted:

> I told her up front that I don't know and didn't do a lot of FFA in high school. She respected that up front and from then on I could go to her and say I don't know... She saw me working hard and even when I was making mistakes it was ok.

Student teachers faced a specific fear of misunderstanding and wanted to be given the opportunity to apply their own personality and approaches to teaching situations.

The next concept related to important factors in their relationship with cooperating teachers was being able to come into a classroom as a portion of an established culture. Student teachers in the focus group had both positive and negative experiences on their relationship based on this integration process. Participant-9 said, "Mine [cooperating teacher] had rules and classroom management established so when a student teacher comes in it's fine."

Other student teachers mentioned that the cooperating teacher's established culture had a negative impact on the relationship. According to Participant- 13 "My [cooperating] teacher just sat in the room, the kids respected me more when he wasn't in there. When he came in the disrespect came back too." Many of the student teachers in the focus group stated their frustration with the relationship when they were not allowed to become a part of the cooperating teacher's inner circle.

A factor that was mentioned as a concern from this group was that, as student teaching occurred in the spring, the culture of the classroom was already established prior to their arrival. The student teachers all suggested that if they could have been a part of the creation of the culture the previous semester a great deal of the turmoil that was experienced could have been avoided.

The final theme emerging from the student teacher's perceptions of their relationship with their cooperating teacher was the impact of differences or similarities in personality on the overall relationship. Participant-7 appropriately identified the differences in the way she and her cooperating teacher processed information when confronted with one of these points. "I was supposed to take over ag mech, but he made me watch him first period...I'm not a watcher I'm a doer so I didn't completely understand it." She continued by summarizing that the experienced differences with the cooperating teacher eventually strained their relationship.

Participant-2 stated the importance of a having a similar personality to the cooperating teacher by saying, "We both like to try things out. It was ok when what I tried didn't work out because we could talk about it and try something new." Her feelings were echoed by several others who said that being similar in nature to their cooperating teacher allowed the trust level to increase. Participant-3 said that because they worked in a similar fashion, "my [cooperating] teacher was like, oh here teach whatever you want; just ask if you need help, I trust you."

Research Question Two: What factors do cooperating teachers find important in their relationship with student teachers?

From interviews with cooperating teachers, three categories of thoughts emerged related to their thoughts on the important factors in student teacher relationships. The emergent themes in this area included good communication as a factor in success, the role of gender in the interaction, and the importance of student teacher effort and dedication to the student teaching role.

The most prevalent theme observed in the analysis of cooperating teacher interviews was the importance of good communication in building and maintaining a successful relationship with student teachers. Shelby explained the breakdown in the relationship that can occur when a student teacher is a poor communicator, explaining a situation with a recent student teacher as follows:

> She was just…a non-communicator. She would sit and just stare and I think she was trying to come up with questions, but it was weird that she just looked at me and would never talk. I just wanted her to tell me what was happening in her brain so I could help her, but she didn't ever say anything. Like, even when I gave suggestions, I would get

> kind of a shrug and a grunt. Her lack of ability to communicate with me is I think a big reason why she wasn't successful. I can't help someone who I can't interact with.

Stephanie echoed the comments saying that she could have a good relationship with any student teacher if they just "weren't afraid to ask." James mentioned that he felt like his relationship with student teachers was based completely on the ability for the two to communicate as colleagues.

Another theme which emerged from the data and was mentioned by all four cooperating teachers was the role gender plays in mentoring teacher and student teacher relationships. Cooperating teachers felt as though gender was an overlooked concept that played a large role in their abilities as a mentor. Stephanie summed up the sentiments of the group when she said:

> I know that I mentor differently because I'm a woman. I guess I take a more 'mothering' role toward the student teachers I have worked with. I want them to be successful because I think it is in the nature of a woman to be nurturing.

Stephanie continued by sharing an example of her nurturing nature. She told of a time when a male student teacher obviously lacked the funds to purchase many teacher clothes, She said that she got him a gift card and gave him a card telling him he was doing a great job and to use the gift card to buy more clothes. She said, "I know neither of the male ag. teachers he [the student teacher] was working with here even noticed that he was lacking, it was the mother in me that wanted him to have more. I see the student teachers as my children."

While Shelby did not mention gender specifically as a factor related to relationships, she said:

> I enjoy having a student teacher who reminds me of me. When I have a young girl here who is enthusiastic about the profession, I feel like I get a glimpse of who I was when I was student teaching. I get to tell her all the things I wish someone had told me.

Gender role was not always viewed as a positive factor in mentoring. Madison mentioned the difficulty in mentoring another female by saying:

> Two women together [as cooperating teacher and student teacher] is hard. I sometimes feel like female student teachers take things too personally. As a woman ag. teacher, I know there is not that much tolerance for whiny girls in the profession. I try to help the student teachers understand that there are big problems coming for them if they act too sensitive, and try to harden them up.

James brought the male perspective to the gender conversation, explaining that he feels it is easier for him to interact with someone who his like him, and that his interactions with male student teachers have been easier than if he had to deal with female student teachers. He said. "I've never really dealt with one [a female student teacher], I don't think I'd know where to start."

The final theme emerging from cooperating teachers thoughts about factors of successful relationships with student teachers was the role that student teacher dedication plays in the interactions. Madison said that she didn't really respect student teachers who came without wanting to improve their teaching skills. Stephanie said, "I've had student teachers who were incredibly dedicated, and some who weren't, it's hard to build a relationship with someone who really doesn't want this as a career" and "when I know they just don't want to be ag teachers, I don't feel as compelled to help them."

Shelby felt as though it was not necessarily about dedication to the profession, but dedication to the task at hand saying:

> I know that I have had student teachers who really didn't want to be teachers when they graduated, but as long as they show up every day ready to work during student teaching, I still respect them. This job isn't for everyone, but work ethic is.

James also mentioned the dedication of student teachers, saying, "If they work hard and try, they'll get better. My favorite faculty member always said 'people will forgive a lot of mistakes if they know you're trying.' That's true for student teaching too.

Research Question 3: What suggestions do student teachers and cooperating teachers have for improving the placement process to increase the success of mentoring relationships?

Student teachers had a very concise and collectively derived list of the factors they felt were important to use in making placement decisions. Within the context of the focus group discussion, the following list of factors were agreed upon: ability of the student teacher to meet program expectations, and the ability of cooperating teacher to give the desired level of feedback.

To expand on the justification for their list, the student teachers agreed that their own level of competency was important to consider in placement. Participant-1 said that her cooperating teacher dedicated a lot of time and effort to creating a student teacher who truly wanted to be an ag teacher. She said, "I wouldn't send someone to my cooperating teacher that didn't want to teach, It would have been a waste of her help." She continued by stressing that while she had a positive relationship in with her cooperating teacher, "some student teacher that saw student teaching as a blow off and doesn't want to teach, they would have gone in and hated every minute of it." Participant-11 echoed the sentiment saying, "student teachers who go to the school I was at need to be prepared to work, that's what they expect." Participant-9 gave her thoughts on the subject saying, "if you are placed some where the cooperating teacher is busy and active you have to know how to be independent."

Student teachers felt as though placements would be more successful if matching could be based on cooperating teachers who respond to the feedback needs of their student teachers. Participant-7 shared her views on feedback for placement by saying:

> Feedback is very important you could think you are doing a marvelous job and you aren’t so its important for your teachers to give you feed back. I like them leaving me alone and I like when they sat down and told me what I was doing well and what I needed to.

She continued by explaining that the levels of feedback a cooperating teacher is likely to give should be used as a factor in placement. Others echoed the sentiment, stating that while some wanted more feedback and others wanted less, there was value in being paired with a cooperating teacher who could match feedback desires.

Cooperating teachers felt that matching should be based on student teacher proficiency and personality characteristics. They outlined that they all feel as though they are satisfied with the current student teaching process, and all needed to be prompted in their interviews to respond with specific things that should be done to make placement decisions.

With regard to student teacher proficiency, cooperating teachers mentioned the need for a student teacher to have an expected level of competency matched to the program they were placed in. For example, Stephanie doesn't think that her program is a great fit for someone who doesn't have a strong background, because the community expects that they will be successful with teams, and it's a "steep learning curve if they don't have the background." Shelby shared that she feels strongly that student teachers who were not in FFA in high school should be sent to a program that allows them to have a more gradual introduction to the responsibilities of running a successful FFA chapter. James said, “I’m ok to teach someone, but I can only do so much if they have no background knowledge about how to run our type of program.”

The next factor for placement emerging from cooperating teacher conversations was the importance of examining potential personality interactions. Stephanie spoke about the importance of personality by saying, “it's just like with a student, if you butt heads, you cope, but it's not pleasant or productive for either person involved.” She continued by sharing a story of a student teacher she mentored, saying, “there was just something about her that rubbed me the wrong way.” After several personality conflicts and differences of opinions, said she still tried to do her best to be a good mentor, but was no longer personally invested in that young lady's success. Shelby shared an opposite situation related to personality, saying about a recent student teacher:

> I realized that she was a lot like me, and we ended up getting along great. In fact, I'm trying to get them to open a position here so that we can hire her to come teach with us once she finishes her Master’s degree this spring.

Related to personality characteristics, James wrapped up the sentiments of the four cooperating teachers best. He said:

> You [university faculty] know us [cooperating teachers], you know them [student teachers], placing them [student teachers] should just be a matter of deciding who they will get along with. I mean, I’d rather not mentor a student teacher than have one that I can’t have a positive relationship with.

Assertions and Implications

Qualitative research allows for emergent findings that yield assertions about the situation (Yin, 2010). Based on the results of this study, we feel comfortable asserting that both student teachers and cooperating teachers feel the relationship during student teaching is important to the overall success of the student teaching experience. Evidence collected in the audit trail points to relationship as an important factor mentioned by every cooperating teacher and student teacher included in this study.

The decorum and understating built in to the complex nature of the student teacher cooperating teacher relationship informs the development of the student teacher as a confident educator with a defined voice. It has been noted that student teachers value the freedom to explore who they are as a teacher and who they could be. There is an understanding that the cooperating teacher's experience is there to be a kind of safety net to the student teacher. This perceived safety net allows the student teacher the chance to grow with a perceived reduction in fear of failure. As has been reported, student teachers report that the openness to not be 100% correct all of the time allowed for breathing room and helped to elevate fear that could become debilitating to some. Cooperating teachers echoed the importance of open communication with student teachers, although they wanted to be matched with student teachers who fit their program and were capable.

It could be suggested that as university supervisors and institutions make placement decisions about student teaching sites and assign cooperating teachers the potential need for the student to be active in their experimentation should be understood. The cooperating teachers could be evaluated for their reluctance or proclivity towards active experimentation. Along with establishment of student teacher desire for active experimentation could lead to more successful placements.

Cooperating teachers facilitating incorporation of the student teacher into the culture of the classroom was noted as being a theme expressed during our research. The general consensus of the panel was the establishment of a culture with in the classroom to be the explicit job of the cooperating teacher. As the opinion leader in the community of the classroom it is inherent to the job of the teacher to incorporate the newcomers, in this case the student teacher, in the community of the classroom (Rogers, 2010). The selection process of cooperating teaches could be informed by their likelihood to play the role of the opinion leader in their own classroom.

The suggestion was made by the student teacher panel that the use of the spring semester as the experience semester could lead to increased difficulty in the incorporation of the preservice teacher into the established community. Future studies could be developed that assess the use of the spring versus the fall semesters and the student teachers perceptions of incorporation.

Both groups perceived, as prior research has indicated, the relationship between student and cooperating teachers as fundamental to the student teaching experience. The variations that existed in the relationships were seen to have both positive and negative effects on the student teacher development. The perception was that similarities in certain aspects of learning and personalities added to an overall better experience. Likewise the student teachers suggested that certain discontinuities hindered certain types of individuals from having optimal experiences. The volumes of data collected through this study highlight the importance of qualitative examinations of the student teaching experience. A line of inquiry should be developed to explore the individual personality and learning types and the interactions these types have on the perception of the effectiveness of the overall experience of student teaching.

The panel of student teachers settled on one statement as being the most profound factor of the student teacher and cooperating teacher relationship. The statement centered around the student teachers ability to project themselves on the cooperating teacher. The student teachers had an expressed need to be able to see their future in a positive way in this mentor. Participant-9 summed up the desires of the group by saying, "I saw myself in a few years as her. That helped me to see myself as a wife and an ag teacher and a mother, it made me want to work harder and pay attention".

References

Anderson, N. A., Barksdale, M. A., & Hite, C. E. (2005). Preservice teachers' observations of cooperating teachers and peers while participating in an early field experience. *Teacher Education Quarterly*, 97-117.

Creswell, J. W. (2012). *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks, CA: Sage.

Darling-Hammond, L., & Bransford, J. (Eds.) (2007). *Preparing teachers for a changing world: What teachers should learn and be able to do.* San Francisco, CA: Jossey-Bass.

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2008). *Collecting and interpreting qualitative materials* (Vol. 3). Thousand Oaks, CA: Sage.

Edwards, M. C., & Briers, G. E. (2001). Cooperating teachers' perceptions of important elements of the student teaching experience: A focus group approach with quantitative follow-up. *Journal of Agricultural Education*, *42*(3), 31-42.

Greiman, B. C. (2002). *Providing professional and psychosocial assistance for beginning agriculture teachers: The perceptions of formal mentors and novice teachers* (Doctoral dissertation) University of Missouri, Columbia.

Greiman, B. C. (2007). Influence Of Mentoring On Dyad Satisfaction: Is There Agreement Between Matched Pairs of Novice Teachers And Their Formal Mentors?. *Journal of Career and Technical Education, 23*(1).

Hall, K. M., Draper, R. J., Smith, L. K., & Bullough, R. V. (2008). More than a place to teach: Exploring the perceptions of the roles and responsibilities of mentor teachers. *Mentoring & Tutoring: Partnership in Learning*, *16*(3), 328-345.

Harlin, J. F., Edwards, M. C., & Briers, G. E. (2002). A comparison of student teachers' perceptions of important elements of the student teaching experience before and after an 11 week field experience. *Journal of Agricultural Education, 43*(3), 72-83. doi: 10.5032/jae.2002.03072

Kitchel, T. (2006). Perceived differences, by gender, in student teacher-cooperating teacher interactions. *Journal of Southern Agricultural Education Research, 56*(1), 62-75.

Kitchel, T., & Torres, R. M. (2006). The influence of personality type on the extent cooperating teachers provide psychosocial influence to student teachers. *Journal of Agricultural Education, 47*(4), 134-144. doi: 10.5032/jae.2006.04134

Kitchel, T., & Torres, R. M. (2007). Possible Factors in Matching Student Teachers with Cooperating Teachers. *Journal of Agricultural Education, 48*(3), 13-24. doi: 10.5032/jae.2007.03013

Knobloch, N. A., & Whittington, M. S. (2002). Novice teachers' perspectives of support, teacher preparation quality, and student teaching experience related to teacher efficacy. Journal of Vocational Education Research, 27, 331–341.

Kram, K. E. (1985). Mentoring at work: Developmental relationships in organizational life. *Administrative Science Quarterly*.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry.* Thousand Oaks, CA: Sage.

Merriam, S. B. (1988). *Case study research in education: A qualitative approach*. San Francisco, CA: Jossey-Bass.

McGhee, M. B., & Cheek, J. G. (1990). Assessment of the preparation and career patterns of agricultural education graduates, 1975-1985. *Journal of Agricultural Education, 31*(2), 17-22. doi: 10.5032/jae.1990.02017

Montgomery, B. (2000). The student and cooperating teacher relationship. *Journal of Family and Consumer Sciences Education*, *18*(2), 7-15.

O'Brian, M., Stoner, J., Appel, K., & House, J. J. (2007). The first field experience: Perspectives of preservice and cooperating teachers. *Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children*, *30*(4), 264-275.

Ragins, B. R., & McFarlin, D. B. (1990). Perceptions of mentor roles in cross-gender mentoring relationships. *Journal of Vocational Behavior*, *37*(3), 321-339.

Roberts, T. G. (2006). Developing a model of cooperating teacher effectiveness. *Journal of Agricultural Education, 47*(3), 16-32. doi: 10.5032/jae.2006.03016

Roberts, T. G., Harlin, J. F., & Briers, G. E. (2009). Predicting Agricultural Education Student Teachers' Intention to Enter Teaching. *Journal of Agricultural Education, 50*(3), 56-68. doi: 10.5032/jae.2009.03056

Rogers, E. M. (2010). *Diffusion of innovations*. New York, NY: Simon and Schuster.

Spradley, J. P. (1979). *The ethnographic interview*. New York, NY: Holt, Rinehart and Winston.

Sudzina, M., Giebelhaus, C., & Coolican, M. (1997). Mentor or tormentor: The role of the cooperating teacher in student teacher success or failure. *Action in Teacher Education*, *18*(4), 23-35.

Tabacbnick, B. R., & Zeichner, K. M. (1984). The impact of the student teaching experience on the development of teacher perspectives. *Journal of Teacher Education*, *35*(6), 28-36.

Weasmer, J., & Woods, A. M. (2003). The role of the host teacher in the student teaching experience. *The Clearing House*, *76*(4), 174-177.

Whittington, M. S., McConnell, E., & Knobloch, N. A. (2006). Teacher efficacy of novice teachers in agricultural education in Ohio at the end of the school year. *Journal of Agricultural Education*, *47*(4), 26-39. doi: 10.5032/jae.2006.04026

Yin, R. K. (2010). *Qualitative research from start to finish*. New York, NY: The Guilford Press.

Zeichner, K. (2010). Rethinking the connections between campus courses and field experiences in college-and university-based teacher education. *Journal of Teacher Education*, *61*(1-2), 89-99.

Going Against the Grain: Recruiting Atypical Students into a College of Agriculture

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Abstract

A study was conducted to identify the recruitment experiences influencing students with little knowledge or experience in agriculture and natural resources to enroll in a college of agriculture. Three focus groups were conducted comprised of students who had no familial connection, previous knowledge, or formal learning experiences in agriculture and natural resources prior to their enrollment in the college of agricultural sciences and natural resources at a Texas Tech University. Discussion questions were asked regarding specific recruitment experiences influential to participants' decision to enroll into the college of agricultural sciences and natural resources. Data analysis found versatility of degree programs, interactions with faculty, and institutional characteristics such as scholarships, faculty advising, student organizations and small-community atmosphere were factors contributing to participants' committed interests in the [college of agriculture]. Participants suggested recruitment messaging focused on real world applications of degree programs and importance of atypical students within the discipline would have been influential to their transition into an atypical degree program. A major implication of this study was the need to address the exclusivity of the agriculture and natural resources industries as perceived by outsiders. Recommendations for practice include focusing recruitment messaging on inclusion by promoting the diversity of people and opportunities within agriculture and natural resources disciplines and careers.

Introduction

Feeding the world is one of the most prevalent challenges facing the current global population of 7.2 billion people (SFAC, 2014). By 2025, the number of people populating the earth is expected to increase to 8 billion people (United Nations, 2013). With hunger and malnourishment affecting over one billion people today (FAO, 2014), "stark contrasts are apparent between the availability of natural resources and the demands of billions of humans who require them for their survival" (Pimentel & Wilson, 2004, p. 22). Food insecurity is a problem that cannot be solved by a single stakeholder, but requires a variety of actions to address the immediate and underlying causes of hunger and malnutrition (FAO, 2014).

The global agricultural system is challenged to produce more food using fewer natural resources. However, the agricultural workforce equipped to tackle the current and future global demands is diminishing. According to the USDA 2007 Census of Agriculture, the average age of a principal operator of a farm has increased from 52 years old in 1987 to 57 years old in 2007. Additionally, of the estimated 54,000 annual job openings to occur within agricultural, food, and renewable natural resource related fields between 2010-2015, an average of 29,300 graduates from colleges of agriculture and life sciences, forestry and natural resources, and veterinary medicine were expected to fill those jobs annually (Goecker, Smith, Smith, & Goetz, 2010).

In a survey distributed by the Coalition for a Sustainable Agricultural Workforce (CSAW) in 2013, agribusiness companies were asked to report their confidence level in their ability to fill their open employment opportunities through 2015. Six of the largest companies surveyed agreed that: (1) the pipeline of graduates in agriculture and natural resources disciplines was not as full as it needed to be, (2) challenges were anticipated in finding quality applicants, (3) there would be difficulty in hiring the education and experience needed, and (4) some hires would need to be retrained (CSAW, 2013).

The existing gap between career opportunities and the number of experienced and qualified graduates to fill them is expanding. “The supply of agricultural industry professionals is not sufficient to keep up with employer demand” (SFAC, 2014, p. 14). Although enrollment in college-level agriculture and natural resources related degree programs have increased over 30 percent throughout the past eight years, the number of program graduates cannot keep up with the need for young agriculture professionals (SFAC, 2014).

In order to provide the quantity and quality workforce demanded by the agriculture and natural resources industries, both secondary and post-secondary agriculture and natural resources programs must adapt to the changes in the industries and subsequent changes in the prospective student population (Martin, 2003). Since the Industrial Revolution, society has slowly moved away from its agrarian foundation. The United States has experienced a large abandonment of farming as a livelihood (Grandil, 2014; Labao & Meyer, 2001). Russell (1989) found that students enrolling in agriculture programs lacked the agricultural background and related experiences possessed by previous students. For three consecutive years, 1983-1985, Russell found only 46 percent of freshman enrolling in the College of Agriculture at the University of Illinois had been, at least, enrolled in a high school agriculture program. When he observed the profile of freshman enrolling in the college from 1986-1988, 32.3 percent had participated in a high school agriculture program.

In order to fill the expanding gap between the number of graduates and available jobs in the agriculture and natural resources industries, “agriculture’s future workforce (will have to) come from a population that, unlike previous generations, has no natural connection to agriculture” (SFAC, 2014, p. 8). These changes present an opportunity for post-secondary agriculture and natural resources programs to revise recruitment strategies toward a niche audience—where major and career choice is largely based on interest. However, little is known about these potential prospects and their motivation for pursing a degree or career-field they lack in both extensive knowledge and experience.

Colleges of agriculture’s recruitment programs can no longer rely on basic communication efforts to attract students. In order to stand out in the competitive market place, college recruitment must begin to incorporate strategic communications to reach niche groups of prospective students, current students, parents, alumni, and donors (Baker, Settle, Chiarelli, & Irani, 2013; Smith, 2002). As the pool of prospective students become further removed from production agriculture, there is a need to devise new strategies that appeal to non-agriculture students to colleges of agriculture (Rayfield, Murphey, Skaggs, & Shafer, 2013). This begins with understanding what influences a student’s decision related to academic and career choices (Chapman, 1981).

Lingenfelter and Beierlein (2006) found that recruiting practices for agricultural programs were most successful when specific interests were targeted. "Promoting agriculture as a whole is not enough" (Settle, Doerfert, Irlbeck, Akers, Burris, Wingenbach, & Rutherford, 2012, p. 72). In order to recruit a new agriculture and natural resource workforce, agriculture must become relevant to students' lives and connected to their interests. Russell (1993) recommended that colleges of agriculture would benefit from taking a more active role in introducing students to opportunities in agriculture.

Leading the list of issues found by Myers, Breja and Dyer (2004) to affect the success of agriculture program recruitment were teacher quality and commitment, program quality, focus on production agriculture, perceived career opportunities, salary considerations, image of agriculture and the program, and availability of agriculture programs to students. Similarly, Morgan and Shim (1990) discovered the most significant factor affecting attitudes toward a specific major was perceived career image. "People (often) rely more on the perceived than tested abilities in formulating their interests" (Lent, Brown, & Hackett, 1994, p.90). Of 170 students surveyed about their attitudes toward the field of agriculture, Shenaifi (2013) found that 84 % agreed that only students with a farm background should pursue agricultural related careers.

Fraze, Wingenbach, Rutherford and Wolfskill (2011) found that urban high school students developed a more positive attitude concerning agriculture as a subject, college major and career after attending an agriculture recruitment workshop. For non-agriculture students, Settle et al. (2012) found that after participating in an agricultural communications workshop self-efficacy and career interest in agriculture increased. Students participating in the same workshop from agriculture backgrounds decreased in both constructs of the study. The results suggest that students with existing knowledge and experience in an agricultural-related field were not as receptive to the programs ability to increase self-efficacy and career interest. Therefore, Settle et al. recommends "similar programs would have more success if they focused on non-agriculture students" (p. 75).

"Gaining insight regarding the factors that have a stronger predictability for students to choose a major have potential to influence educational programs and/or recruiting tools used by high schools, colleges, industry and government" (Hegerfeld-Baker, Anand, Droke, & Chang, 2015, p. 35). With this information, colleges of agriculture can develop targeted recruitment strategies in order to increase enrollment numbers and diversify the profile of graduates available to fill positions in the food, agricultural and natural resources systems (Bobbitt, 2006).

Theoretical Framework

A variety of decision-making models have emerged from the relevant body of literature dedicated to describing the various factors and motivations influencing academic and career choice (Galotti, 1999). Decision-making is often conceptualized into a series of steps and incorporates variables of influence that affect the end result to varying degrees. This study utilized Chapman's *Model of Student College Choice* (1981) to guide the development of discussion questions specific to the recruitment experiences atypical students found influential to their decision to enroll in [a southwestern university's college of agriculture]. The model represents student college choice as being influenced by both the characteristics of the student and external influences (Figure 1). For the purpose of this study, the characteristics of the students were acknowledged as affecting the available recruitment opportunities and experiences of students, but were not investigated in depth.

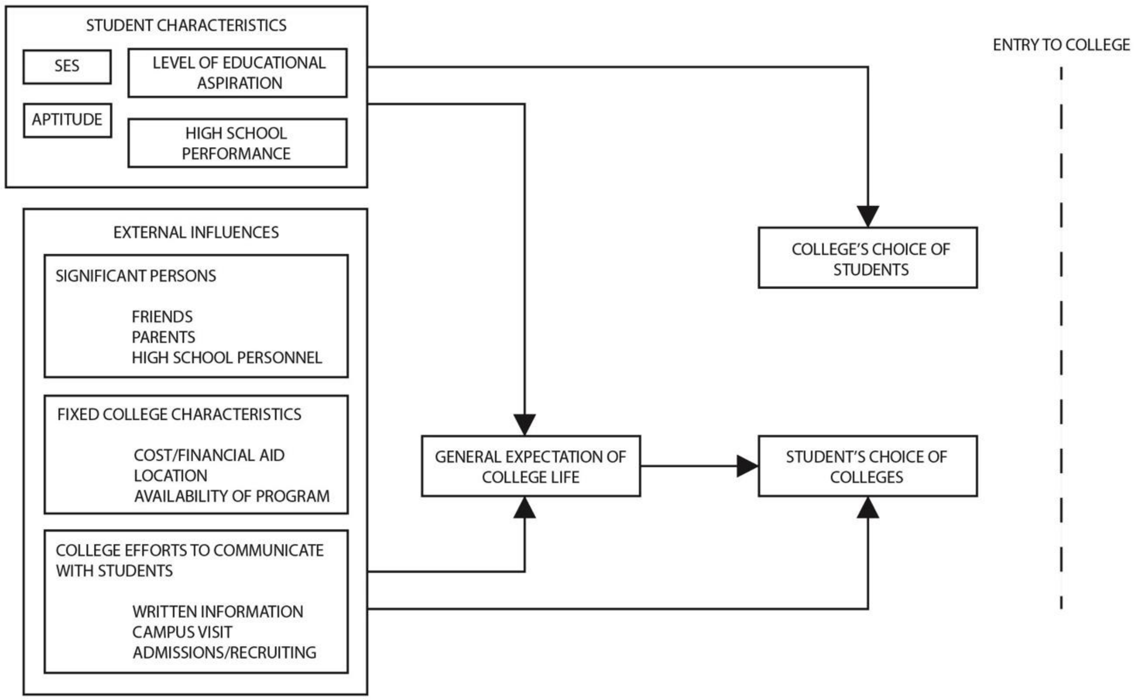

Figure 1. *Influences on Student College Choice (Chapman, 1981). Reprinted by permission.*

External influences discussed by the model are grouped into three categories: (1) the influence of significant persons, (2) the fixed characteristics of the institution, and (3) the institution's effort to communicate with prospective students (Chapman, 1981).

Purpose/Objectives

As part of a larger investigation, the purpose of this study was to identify the recruitment experiences influencing atypical students' decision to enroll in [a college of agriculture] at [a southwestern university]. This study fits into the National Research Agenda, Priority Area 3: Sufficient Scientific and Professional Workforce That Addresses the Challenges of the 21st Century (Doerfert, 2011). This priority area focuses on "developing the models, strategies, and tactics that best prepare, promote, and retain new professionals who demonstrate content knowledge, technical competence, moral boundaries, and cultural awareness coupled with communication and interpersonal skills" (p. 9). The following objectives guided this study:

1. Identify the recruitment experiences influential to atypical students' decision to enroll in [a college of agriculture] at [a southwestern university].
2. Identify the messages influential to atypical students transitions into [a college of agriculture] at [a southwestern university].

Methods

This study utilized a qualitative phenomenological research design in order to accomplish the objectives for this study. Through the qualitative lens the greatest depth of understanding could be achieved regarding the experience of these students, which could not be explained by numerical data (Berg, 2009).

Qualitative research designs are inductive, flexible and non-linear, "…what researchers learn in the earlier stages of the research substantially affects subsequent stages of the research process" (Frankel & Devers, 2000 p. 253). The emergent design allows the researcher to broadly specify aspects of the study beforehand. Methods may be manipulated and adjusted as important components of the investigation are revealed and witnessed by the researcher (Ary, Jacobs, & Sorensen, 2010). These manipulations and adjustments to the methodology were recorded in a reflective journal kept by the researcher during the study.

Instrument

This study utilized the researcher as the means to collect and analyze data, a method Ary, Jacobs, and Sorensen (2010) identify as an identifiable characteristic of qualitative research. Humans provide the means for gathering unquantifiable data because they can continually clarify, correct and amplify meaning from the participants under observation (Berg, 2009; Lincoln & Guba, 1985). "Only people can grasp confusing pieces of data and process them as soon as they are made available" (Peredaryenko & Krauss, 2013 p. 2). Throughout the qualitative process, the human instrument is able to adapt and respond to the various environments and social contexts that may arise (Ary, Jacobs, & Sorensen, 2010).

Participants

The target population for this study was current undergraduate students with little to no knowledge of or experience in agriculture and natural resources prior to their enrollment. Knowledge and experience in agriculture and natural resources were defined as previous involvement in an extracurricular or educational agriculture or natural resource activity or organization, such as FFA or 4-H, and being less than two generations removed from production agriculture or natural resources.

This study utilized a purposeful sampling method of participants based on the following criteria used to describe the atypical student populace:

- Over the age of 18
- Participant has never participated or been a member of the 4-H or the FFA organizations prior to their enrollment.
- Participant has never taken an agricultural or natural resources education course prior to their enrollment.
- Participant's parents have never been dependent on an income or salary accumulated from production agriculture and/or natural resources.
- Participant's grandparents have never been dependent on an income or salary accumulated from production agriculture and/or natural resources.

Because random selection often is not an option within qualitative research, purposeful sampling is utilized to facilitate information rich cases of the phenomenon the researcher wants to explore (Seidman, 2006). Patton (2002) describes information-rich cases as "those from which one can learn a great deal about the issues of central importance to the purpose of the research" (p. 46). All individuals participating in this research study were considered to be an information-rich case based on their identification with the criteria requested by the researcher.

In total, ten participants made up the sample for this study. Three focus groups were conducted with three participants in focus group one, three participants in focus group two, and four participants in focus group three. Literature discussing focus group size often suggest a range from as few as four and as many as 12 participants. Although condensing two of the focus groups in this study was an option, the researchers decided to separate the groups into a more manageable size. Additionally, these small groups were believed to provide participants more of an opportunity to share their ideas (Krueger & Casey, 2009). Fern (1983) suggests that more information is obtained by conducting two focus groups of four than one eight-person focus group. With this in mind, participants were given the opportunity to select which focus group they would attend based on their availability.

Procedures

Data were collected in the spring of 2015. Data analysis occurred both during and after data was collected. Three focus groups were scheduled and conducted during the months of February and March. Each focus group lasted anywhere between 60-90 minutes and were video recorded to document verbal and nonverbal responses and aide in transcription.

Before data collection could begin, the researchers sought approval from the Institutional Review Board (IRB) to ensure the well-being of research participants throughout the study. Additionally, an informed consent form was created and distributed by the research to ensure that participants knew both the risks and their rights regarding the research. The form reiterated the purpose for the research and intended use for the findings. Secondly, the form documented the voluntary involvement within the study for the participant, researcher and IRB to review if necessary (Berg, 2009).

Each focus group was structured around fourteen open-ended discussion questions regarding participants' transitions and experiences influencing their interest in agriculture and natural resources and subsequent enrollment in a post-secondary degree program. "As participants answer questions, their responses spark ideas from other participants" (Krueger & Casey, 2009, p. 35). Discussion questions were developed in order to explore atypical students' development of interest in agriculture and natural resources as well as their commitment to an academic or occupational pursuit within a related subject area. Questions asked were focused on participants' recollection of activities or events that influenced their initial interests, decision-making process, and final decision regarding enrolling in the college of agriculture. Of the fourteen questions asked to each focus group, a variety of probing questions were used as a method to reveal unique meaning and understanding of the phenomenon under investigation.

Focus group discussions were transcribed verbatim from the audio-recordings and field notes were taken immediately following each focus group session, as well as during the review of video-recordings to note nonverbal communication between participants. The compilation of transcriptions and field notes for the three focus groups resulted in 60 pages of written data and

223 minutes of video. Once all focus group discussions were transcribed, data analysis began. The researcher utilized an open, axial, and selective coding method to sort the data into units of meaning, which Ary, Jacobs and Sorensen (2010) identify as "words, phrases, sentences, subjects' ways of thinking, behavior patterns, and events that seems to appear regularly and that seems important. Data was analyzed using the directed content analysis method. Berg (2009) explains, "directed content analysis involves the use of more analytic codes and categories derived from existing theories and explanations relevant to the research focus" (p. 341).

Trustworthiness

Congruent with the standards of rigor in quantitative research, validity and reliability are used within qualitative analysis to address the issues of truth-value, applicability, consistency and neutrality (Ary, Jacobs, & Sorensen, 2010). Program evaluation, more specifically establishing that data is valid and reliable, can be determined through strategies in which trust is built within the qualitative methodology (Thomas & Magilvy, 2011). Lincoln and Guba (1985) recognize four components within the qualitative research process that address validity, reliability and the issues of rigor: credibility (truth-value), transferability (applicability), dependability (consistency), and confirmability (neutrality).

Establishing credibility within research establishes truth-value of the data. Credible conclusions are interpreted from the collection of data alone and not based on the researcher's personal bias. It was important during data collection to allow participants to express their own thoughts completely. Through this practice, the data portrayed the actual words and natural progression of participants and reflected their own experiences at the time of the focus group (Seidman, 2006). The researcher also made entries in the researcher's journal and took notes corresponding to each focus group to establish within-method triangulation, a validation of credibility within the findings. Utilizing these journal entries and notes, transcriptions of each focus group were compared and crosschecked to verify the accuracy of findings. This allowed the researcher to confirm observations and conclusions from multiple data sources (Ary, Jacobs, & Sorensen, 2010). Notes also included the rationale and context in which decisions were made throughout the investigation. This rich, descriptive data provided a means to establish transferability, which explains the specific contexts in which others may want to apply the findings.

Dependability in this study was established through a thorough description of the research methods utilized throughout the investigation (Thomas & Magilvy, 2011). This includes purpose, selection of participants, data collection, data analysis, and findings. Audio and video files, transcripts, notes and journal entries were also organized and stored in a retrievable form on a computer to increase dependability (Ary, Jacobs, & Sorensen, 2010). Lastly, confirmability was reached through this research study by transcribing audio records of each focus group verbatim. After constructing a list of themes, the researcher re-read all transcripts after a two-day period to check for bias.

Findings

The first objective for this study was to identify the recruitment experiences influential to atypical students' decision to enroll in [a college of agriculture] at [a southwestern university].

The data analyzed for this objective diverged one theme, [College of agriculture] interest development, which was specific to what the participants experienced as being influential in identifying [the college of agriculture at a southwestern university] as a college choice and committing to subsequent enrollment. Participants reported that [the college of agriculture] offered a variety of degree options that facilitated multiple interests, the opportunity to interact with faculty and staff on a personal level, and a specific set of institutional college characteristics that influenced their decision to enroll.

Combination of interests

Some participants noted the versatility of degree programs offered in the college allowed them to combine their interest in activities they were already comfortable and confident in with newly developed agricultural-related interests. The availability of degree programs allowed participants to pick and choose degree paths that they could both relate with as well as learn more about. One participant said, “In my degree program we learn graphic design, advertising and public relations with a little bit of ag thrown in. So I feel like whatever life throws at me, I can take it.” Another participant said, “It’s really interesting to realize how alike the business side of everything is compared to like if you look at what I am learning in the ag department, to my friends that are in the actual business department. It is the exact same kind of thing except for the fact that we are learning more life problems.”

Faculty/staff interactions

Participants stated that faculty and staff interactions were a distinguishing characteristic of [the college of agriculture] that influenced their commitment to their degree programs. Through these interactions, participants said they were introduced to the opportunities [the college of agriculture] could offer them that would best fit their needs as students. One participant stated, “I got to meet people within the department and really see the passion that our faculty has for student success and about how people see opportunities for us and our skills and in turn provide opportunities for us to become better in what we are doing.”

Fixed college characteristics

Additional college characteristics that influenced atypical students’ decisions to enroll were scholarships, faculty advising, student organizations, and the small community-type atmosphere. These college characteristics, congruent to the fixed college characteristics represented in Chapman’s model, represent the factors participants were able to compare and contrast between other colleges of agriculture.

The second objective for this study was to identify the messages influential to atypical students transitions into [the college of agriculture at a southwestern university]. Participants did not report any specific messages already being utilized by [the college of agriculture] for recruitment. However, this theme represents the messages participants felt would have been effective in attracting them to [the college of agriculture] earlier in the college choice process. Two subthemes, real world applications and the importance of atypical students, were developed through the discussion of messages participants wish they would have heard when considering their academic and career pathways.

Real world applications

The majority of participants talked about the functionality of their degree programs. A common misconception of agriculture and natural resources related degrees is that they can only be utilized within the agriculture and natural resources industries. However, participants unanimously declared that their degree would be useful to them in a real-world setting because agriculture and natural resources will always been a relevant industry. One participant said, "I am applying what I am learning in a practical way in my home." Additionally, many participants talked about the job security and long-term importance of their degrees. One participant expressed this view by saying, "There is job security out there in agriculture jobs and agricultural degrees because agriculture is not going away. We always have to have it."

Participants also said that their transition into [the college of agriculture] would have been facilitated earlier if they had known about the different options that were available to them academically and vocationally. For example, one participant said, "I wish there would have been more information about getting a degree within the ag industry because there are so many different options. I think when you hear about getting a degree or job within the ag industry, it is very small or very specific." In conclusion, one participant said, "My advisor told me that you have unlimited options if you get a [agriculture and natural resource] degree."

Importance of atypical students

Participants suggested that another approach to recruiting atypical students to the college was to make them feel important. The data analysis for this subtheme was compiled from the discussion of the benefits of having atypical students in the field of agriculture and natural resources. One participant said, "I think just diversity. We come from different backgrounds and we bring different aspects that other kids wouldn't. I think more of an outside perspective. If you have been within the industry your entire life, I think you can be in a bubble." Another participant supported this by saying, "We come from different backgrounds and we bring different aspects that other students wouldn't."

Conclusions

Research objective one sought to identify the recruitment experiences influencing atypical students' decision to enroll in the [college of agriculture at a southwestern university]. The data analysis related to this objective concluded the factors influencing decisions of participants to enroll and declare a major in [the college of agriculture]. The availability and versatility of degree programs, faculty and staff interactions, and institutional characteristics of the college such as scholarships, faculty advising, student organizations and small-community atmosphere influenced atypical students' college choice. These institutional characteristics were relatively fixed within the short-term perspective of [the college of agriculture], which allowed the participants the opportunity to compare and contrast the characteristics of other institutions (Chapman, 1981).

Significant persons relevant to atypical students enrollment into [the college] were faculty and staff. Through their interactions and conversations, participants began to develop an idea of what life in the college would be like. Comments solicited by faculty and staff during these interactions helped shape participants' expectations (Chapman 1981). Similarly, Washburn (2002) found that personal conversations with college professors were most useful to students when choosing a college. Participants concurred that faculty interactions were a major selling point when deciding to pursue a degree through [the college of agriculture].

Research objective two sought to identify the messages influential to atypical students transitions into the [college of agriculture at a southwestern university]. In addition to significant persons and fixed college characteristics, Chapman (1981) describes the college's efforts to communicate with students as the third external influence on student college choice. These efforts can include written information (i.e. recruitment materials), campus visits and admissions/recruiting events. None of the participants recalled specific written information as being influential to their decision to enroll in [the college of agriculture], however, campus visits and recruitment events were noted to affect their decision. Through these visits and events, participants reported receiving the opportunity to meet and interact with the college's faculty and staff, which was most influential in their decision.

Participants stated that specific messaging targeted for atypical students should be utilized. These messages included highlighting the real world applications of agriculture and natural resources topics and promoting the importance of atypical students. Real world applications included the functionality of degree programs and the current and future relevance of the agriculture and natural resources industries. Not only did participants find their degrees to be useful to daily life, they discussed the stability and security within the career-field. However, these realizations were achieved only after the participants had enrolled in their respective degree programs. Many of them reported that if the benefits of pursuing a career in the agriculture industry had been communicated to them earlier in life, their transition into the discipline would have happened earlier.

Additionally, participants placed importance of messages identifying the importance of atypical students to [the college of agriculture] and the industry as a whole. Based on the predispositions of focus group participants about the field of agriculture and natural resources, none of them knew the need to recruit a "new breed of farmer" in order to overcome the existing challenges in the global agricultural system. Identifying the benefits of atypical students to the overall success of agriculture and natural resources programs would provide encouragement to students with similar backgrounds considering entering the career field.

Recommendations

Within a recruiting context, institutions are adopting marketing and public relations practices to attract students to their various programs (Kotler, 1975). In order to stand out in the competitive market place, college recruitment must begin to incorporate strategic communications to reach niche groups of prospective students, current students, parents, alumni, and donors (Baker, Settle, Chiarelli, & Irani, 2013; Smith, 2002).

For practice, it is recommended that [the college of agriculture at a southwestern university] promotes inclusion of atypical students by focusing on the diversity of programs and career options the discipline of agriculture and natural resources has to offer. Many participants reported that they assumed the agriculture and natural resources industries, including available academic and career opportunities, were exclusive to individuals with knowledge or experience in related fields. [The college of agriculture] could start profiling their current student body to identify where and what backgrounds students are coming from, as well as what their academic and career aspirations are. Profiles could then be used, with consent, to recruit other niche groups of students to the programs. It is suggested that an atypical student campaign is developed and distributed by promoting diversity through various written and digital recruitment materials including flyers, brochures, picture and videos. Future research on the effectiveness of the campaign in recruiting niche groups of students should later be conducted.

Additionally, [the college of agriculture] recruitment initiatives focus primarily on institutional characteristics of the college. The characteristics most influential to the atypical students who participated in this study were scholarships, faculty advising, student organizations, and small community-type atmosphere. These reported characteristics should be used to inform the focus of written materials targeted toward typical students. Additionally, the findings of this study suggest that when targeting prospective atypical students, recruitment messages should focus on the need for atypical students in the discipline, functionality of degrees and current students with atypical backgrounds.

Lastly, The findings from this study also emphasize the influence faculty interactions have on atypical student major choice. After meeting or having a personal conversation with a professor, staff member or current student, participants reported feeling more informed in their outcome expectations of the degree programs. In turn, these perceived expectations worked to inform goals of future behavior. It is recommended that faculty play a proactive role in the recruitment process of atypical students. This would involve the incorporation of faculty members in admission and recruitment events.

In conclusion, overcoming the singular challenge present in the global agricultural system—increasing food production while using fewer natural resources—will take a new breed of farmer. This study explored the recruitment strategies effective in influencing atypical students' decisions to enroll in a post-secondary agriculture and natural resources program. The findings from this study were used to revise the recruitment efforts for [a southwestern university's college of agriculture] toward attracting prospective atypical students. In relation to the National Research Agenda Priority Area 3: Sufficient Scientific and Professional Workforce That Addresses the Challenges of the 21st Century (Doerfert, 2011), the findings from this study should be utilized toward providing enough qualified and capable graduates in the agricultural and natural resources fields that will adopt new and technically advanced farming practices, increase food security and improve the overall quality of life on earth.

References

Ary, D., Jacobs, L.C., & Sorensen, C. (2010). *Introduction to Research in Education* (8th ed.). Belmont, CA.: Wadsworth Cengage Learning.

Baker, L.M., Settle, Q., Chiarelli, C., & Irani, T. (2013). Recruiting strategically: Increasing enrollment in academic programs of agriculture. *Journal of Agricultural Education, 54*(3), p. 54-66. doi: 10.5032/jae.2013.03054

Berg, B. (2009). *Qualitative Research Methods* (7th ed.). Boston, MA: Pearson Education Inc. Bobbitt, R.K. (2006). *Factors influencing recruitment, retention, and job placement in the College of Agricultural Sciences and Natural Resources at Texas Tech* (Unpublished master's thesis). Texas Tech University, Lubbock, TX.

Chapman, D. W. (1981). Model of student college choice. *Journal of Higher Education, 52*, p. 490-505. doi:10.2307/1981837

Coalition for a Sustainable Agricultural Workforce. (2013). 2013 Agricultural Science Workforce Census. Retrieved from: http://www.sustainable-ag-workforce.org/sites/g/files/g157851/f/attachments/CSAW2013Census.pdf

Doerfert, D. L. (Ed.) (2011). National research agenda: American Association of Agricultural Education's research priority areas for 2011-2015. Lubbock, TX: Texas Tech University, Department of Education and Communications.

Doody, O., & Noonan, M. (2013). Preparing and conducting interviews to collect data. Nurse Researcher, 20(5), 28-32.

Fern, E.F. (1983). Focus groups: A review of some contradictory evidence, implications, and suggestions for future research. *Advances in Consumer Research, 10*(1), p. 121-126.

Food and Agriculture Organization of the United Nations, International Fund for Agricultural Development, and Word Food Program. (2014). The state of food insecurity in the world 2014: Strengthening the enabling environment for food security and nutrition. Rome: FAO. Retrieved from: http://www.fao.org/3/a-i4030e.pdf

Frankel, R. & Devers, K. (2000) Study design in qualitative research—1: Developing questions and assessing resource needs. *Education for Health, 13*(2), p. 251-261.

Fraze, L. B., Wingenbach, G., Rutherford, T., & Wolfskill, L. A. (2011). Effects of a recruitment workshop on selected urban high school students' self–efficacy and attitudes toward agriculture as a subject, college major, and career. *Journal of Agricultural Education, 52*(4), p. 123–135. doi:10.5032/jae.2011.04123

Galotti, K. (1999). Making a “major” real-life decision: College students choosing an academic major. *Journal of Educational Psychology, 91*(2), p. 379-387.

Grandil, T. (2014). Traditional view of non-traditional. *The Agricultural Education Magazine, 86*(5), p. 6-7.

Goecker, A.D., Smith, E., Smith, P.G., & Goetz, R. (2010) Employment opportunities for college graduates in food, energy, and the environment: United States, 2010-2015. Retrieved from: http://www3.ag.purdue.edu/USDA/employment/documents/usdaemployop2010.pdf

Hegerfeld-Baker, J., Anand, S., Droke, L., & Chang, K. (2015). Factors influencing choosing food and agriculture related STEM majors. *NACTA Journal, 59*(1), p. 34-40.

Krueger, R. A., & Casey, M. A. (2009). *Focus Groups : A Practical Guide for Applied Research.* Thousand Oaks, CA: Sage Publications.

Lent, R.W., Brown, S.D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior, 45*(1), p. 79-122.

Lincoln, Y. & Guba, E. (1985). *Naturalistic Inquiry*. Newbury Park, London, New Delhi: Sage Publications Inc.

Lingenfelter, K.M. and J.G. Beierlein. (2006). Recruitment into the college of agricultural sciences: factors related to student major choices. Proceedings of 2006 American Association of Agricultural Education National Research Conference.

Lobao, L. & Meyer, K. (2001). The great agricultural transition: Crisis, change, and social consequences of twentieth century US farming. *Annual Review of Sociology, 27*, p. 103-124.

Martin, M. (2003). Keeping pace with 21st century agriculture. The *Agricultural Education Magazine, 76*(3), p. 4-5.

Morgan, G. A., & Shim, S. (1990). University Student Satisfaction: Implications for Departmental Planning. *Home Economics Research Journal, 19*(1), p. 47-66.

Myers, B.E., Breja, L.M., & Dyer, J.E. (2004). Solutions to recruitment issues of high school agricultural education programs. *Journal of Agricultural Education, 45*(4), p. 12-21.

Patton, M. Q. (2002). *Qualitative education and research methods* (3rd ed.). Thousand Oaks, CA: Sage.

Peredaryenko, M. S., & Krauss, S. E. (2013). Calibrating the Human Instrument: Understanding the Interviewing Experience of Novice Qualitative Researchers. *Qualitative Report, 18*(43), p. 1-17.

Pimentel, D., & Wilson, A. (2004). World Population, Agriculture, and Malnutrition. *World Watch, 17*(5), p. 22.

Rayfield, J., Murphey, T.P., Skaggs, C., & Shafer, J. (2013). Factors that influence student decisions to enroll in a college of agriculture and life sciences. *North American Colleges and Teachers of Agriculture*, *57*(1), p. 88-93.

Russell, E. B. (1989). Youth development: Need high priority in the college of agriculture. Proposal submitted to University of Illinois College of Agriculture Priorities Committee, dated May 16.

Seidman, I. (2006). *Interviewing As Qualitative Research : A Guide for Researchers in Education and the Social Sciences.* New York: Teachers College Press.

Settle, Q., Doerfert, D. L., Iribeck, E., Akers, C., Burris, S., Wingenbach, G., & Rutherford, T. (2012). The Effects of an Agricultural Communications Workshop on Self-Efficacy and Career Interest: A Comparison between Agriculture and Non-Agriculture Students. *NACTA Journal*, *56*(4), p. 71-77.

Shenaifi, M.S. (2013). Attitudes of students at college of food and agricultural sciences toward agriculture. *Journal of the Saudi Society of Agricultural Sciences*, *12*(2), p. 117-120.

Smith, R. D. (2002). *Strategic Planning for Public Relations*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

STEM Food and Ag Council. (2014). The first annual report of the STEM Food & Ag Council. (Annual Report 2014). Retrieved from: http://stemconnector.org/sites/default/files/STEM_FoodAndAg_Annual2014.pdf

United Nations. (2013). World population projected to reach 9.6 billion by 2050 with most growth in developing regions, especially Africa-says UN [Press Release]. Retrieved from: http://esa.un.org/wpp/documentation/pdf/wpp2012_press_release.pdf

United States Department of Agriculture. (2009). 2007 census of agriculture. In Washington, D.C. : U.S. Dept. of Agriculture, National Agricultural Statistics Service.

Teachers’ Perceptions of a State Agriculture Dual Enrollment Program

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Abstract

There continues to be a shortage of qualified graduates for agriculture jobs within the United States. One possible reason for this shortage has shown to be the decline in student enrollment in colleges of agriculture. One tool that can increase college preparation for future graduates and help students succeed is the agriculture dual enrollment program. Dual enrollment allows high school students to take courses while dually enrolled in a corresponding college course. The Concerns Based Adoption Model frameworks for levels of use and stages of concern guided this study. The program was found to have a positive impact on students taking more rigorous courses and gaining in-depth knowledge of agriculture. Teachers perceived this program helped in establishing higher standards in coursework and in feeling satisfied about their job. In regards to the campus as a whole, it enhanced prestige and agriculture program reputation. Dual enrollment was seen to have little to no impact on school counselors. Continued professional development is encouraged as teachers enter the higher stages of concern and levels of use. Research focused on the pedagogical approaches of these course offerings will benefit the creation of future high quality dual credit courses.

Introduction

Today’s global economy demands a more educated workforce. Communities need to work together to improve 21st century learning and increase high school graduation rates to prepare more students for college and successful careers (American Graduation Intitative, 2014). In 2009 President Obama made a call to increase college graduation rates by the year 2020. He laid out his desires for this initiative in *the form of innovative strategies that promote college completion.* Less than half of new college students earn an associate’s degree within three years or a bachelor’s degree within six years (National Center for Educational Statistics, 2011). This affects all industries, especially agriculture. This issue is compounded when we find that there continues to be a shortage of qualified graduates for agriculture jobs within the United States (Goecker, Smith, Smith & Goetz, 2010). One reason for this shortage could be contributed to the decline in student enrollment in colleges of agriculture and agriculture majors (Baker, Settle, Chiarelli, & Irani, 2013).

The national high school average freshmen graduation rate (AFGR) is 78.2%. In the state of New Mexico, of every 100 students that enter ninth grade, only 67 will graduate (Stillwell, Sable & Plotts; 2011). This rate is even lower for Hispanic students with a national AFGR of 71% and a state of [STATE] Hispanic average of 63%. Only 32% of New Mexico high school students were found to possess college ready skills in math and science (Winograd & Sallee, 2011). Yasar (2002) found that innovative project-based learning increases conceptual understanding of science and promotes positive attitudes towards learning science. The rate of student success drops further as they continue into higher education. Within the freshman class of 2010, only 39.4% of New Mexico students who entered a four year degree program graduated.

It is secondary and post-secondary educators' job to reach these students through innovative programs that expose these students to the rigor of college courses and higher education expectations early. Such programs allow students to enter higher education better prepared and more likely to succeed in academics and their careers (Bailey, Hughes & Karp, 2005).

An innovative program that can help students succeed and increase college preparation for future graduates is the agriculture dual enrollment program. Even though dual enrollment/concurrent enrollment options have been in use for many years, agriculture based dual enrollment programs are a not as prevalent. Dual enrollment (sometimes referred to as concurrent enrollment) allows high school students to enroll dually in their usual high school class and a corresponding college course (Estación, et al., 2011). These classes can be offered as a face-to-face/online hybrid where students participate in lab activities through their high school courses, but complete assessments (test and quizzes) online from the university instructor. This is also referred to as blended learning (Barnett & Stamm, 2010). This model has a high probability of success because instructors deliver the same rigorous college content while considering the pedagogical strategies that may be better at engaging secondary students (Karp, Bailey, Hughes & Fermin, 2005).

The original intent of the dual credit programs was to provide a challenging curriculum to academically prepared high school students (Kim, Kirby, & Bragg, 2004). As it has evolved, this program has become a tool to help ease the transition from high school to college (Bailey & Karp, 2003), to develop vocational skill readiness, and to reduce time to a college degree (Burns & Lewis, 2000; Menzel, 2006). These programs have been shown to help alleviate student boredom and "senioritis" (Klein, 2007) by allowing for more independence in the learning process. Adelman (2006) found that rigorous and innovative course offerings have a significant impact on the transition from high school to college success. As these programs have become more common, they have become an option for both high and low achieving students (Le & Frankford, 2011).

Studies by Adelman (2006) and Swanson (2008) revealed that momentum to completion is an important factor in a student's quest to obtain a college degree. When students to do not obtain at least 20 credits by the end of their freshmen year or choose not to enroll in postsecondary education right after high school, they do not generate sufficient academic momentum. This may eventually lead to failure to obtain a college degree. Barnett and Hughes (2010) also found that students who participate in dual enrollment enhance their chances for college admission. Participating in dual enrollment has the chance to create circumstances by which students are reluctant to give up the credits earned. These students are perhaps more likely to experience a sense of achievement in their initial college credit classes, and, therefore, enter post-secondary education without delay after high school to a greater degree than non-participants.

Student participation in a dual enrollment program has also showed to have an impact on students' decisions of college majors (Morrison, 2008), college persistence (Andrews, 2001), enhancing self-confidence, and helping students see a connection between academic work and career success (Medvide & Blustein, 2010). Dual enrollment has been shown to benefit underrepresented and underachieving students (Bailey, Hughes & Karp, 2005), students who are enrolled in career and technology education programs, first generation students (Farrell & Siefert, 2007), including both boys and girls (Karp et al., 2007).

Although the benefits of dual enrollment have been addressed, this research study will also help with any perceived barriers to program success. Critics of dual enrollment have also warned about students not participating in these courses until they are ready. Mead (2009) cited students who take courses too young or before they are ready may end up becoming discouraged against any college in the future. The study's review of literature has shown that other concerns exist that must be addressed for a program to be successful. These include: providing strong support systems from both secondary and university students, especially for minority and low income students (Barnett & Stamm, 2010), engaging a broad student population (Edwards, Hughes & Weisberg, 2011), provide appropriate dual course sequencing (Karp, 2006) and modeling hybrid CTE/academic courses that prepares students for career success; all while maintaining high academic standards (Adelman, 2006).

This study addresses the National Research Agenda's Priority Area 5: Efficient and effective agricultural education programs (Doerfert, 2011). This agenda states "Agricultural education has the obligation to show that its curriculum can be used to meet the academic challenges of today's school system while preparing students for a career in the agricultural industry" (Doerfert, 2011, p. 26).

Agriculture Dual Enrollment Program Model

The State of New Mexico School Grading Accountability system requires that all students must have taken at least one dual credit/dual enrollment course or Advanced Placement (AP) class to fulfill the requirements for graduation (New Mexico Public Education Department, 2013). Those classes that were dual credit must have been completed successfully with a grade of "C" or better. In the 2012-2013 school year 79%, of students met this criterion. It was also found that 41% of the students limited themselves to only taking one college course during their high school career. Established relationships with school leaders, teachers, and students can lead to increased enrollment and success of students in dual enrollment programs. Offering more diversity in course selections in the area of agriculture sciences will also help to recruit and retain students in this high need area.

The strategic plan of this program relies on four specific goals for the overall program: access, accountability, affordability, and student success (Eastern New Mexico University, 2015). These courses are offered at no cost to the school or student and are paid for by the state. School administrators, secondary teachers, and university faculty must be in agreement on the courses offered and in what format they will be taught. A memo of understanding (MOU) is kept on file with the high school, college, and the state public education department. Teachers must be deemed qualified by the university faculty who most often require a minimum of a master's degree. Students must be at least a junior in classification and in good academic standing (minimum 2.5 GPA).

Currently Eastern New Mexico University offers six different agriculture dual enrollment courses. These courses include introduction to animal science, dairy science, introduction to horticulture, introduction to metal fabrication, rural buildings construction, and principles of engines and power units. The 18 hours of dual enrollment courses offered all apply directly to majors in agricultural science. These courses are offered in three different formats: fully online through the university instructor, as a hybrid online/face-to-face model with the university faculty offering online content and the secondary teacher leading lab activities; and solely by the high school teacher serving as a university adjunct instructor. It has been found that programs with the hybrid course model have a high probability of success because instructors deliver the same rigorous college content while considering the pedagogical strategies that may be better for engaging secondary students (Picciano & Seaman, 2009).

To ensure program rigor, university instructors and high school teachers work together to make sure students are performing their own work and put forth the required effort. Student assessments are developed by the university instructor and are completed online through the university blackboard system. This increases student accountability and upholds the high standards and rigor of the university. Even though, strengths and benefits of the program have been identified, areas that merit program improvement exist as well. The dual enrollment program, agriculture course offerings and how those courses are offered is continually changing and adapting to best serve the needs of the students, secondary schools, and the university. This research will assist program leaders in addressing all of these needs and making the necessary pedagogical, program and course content changes.

Conceptual Framework

This research was guided by the Concerns-Based Adoption Model (CBAM) (Hall & Hord, 2006), a conceptual framework which describes, explains and predicts probable teacher concerns and behaviors throughout a change process. In this case, the CBAM is applied to the change process of teachers implementing and students enrolling in the agriculture dual enrollment program. It was originally based on research that showed that beginning teachers went through developmental stages and expressed predictable concerns at each stage as they learned to teach (Hall & Hord, 2001). The model was later adapted to measure concerns teachers expressed as they learned to use new practices and the extent to which they actually implemented the innovations.

Today's educational systems involve numerous individuals responsible for facilitating change. These facilitators need a means of assessing the needs of the individuals with whom they work so that the most appropriate and timely assistance can be given. Two important kinds of assessment information CBAM provides are: Concerns of the individual about whatever new programs, products, or ideas (innovations) are being offered, delivered, or implemented and individuals' knowledge of and how they use these innovations. The particular focus of this study was on teachers' stages of concern and levels of use components of that model.

The CBAM is a framework that describes the perceptions and motivations a teacher might have about a change in curriculum and/or instructional practices at different points in its implementation (Sweeny, 2003). Hall and Hord (2006) described multiple stages that a teacher goes through towards program adoption. At Stage 0, Awareness, the teacher has little knowledge about or interest in the change. At Stage 1, Informational, the teacher is interested in learning more about the innovation. Teacher concerns at Stage 2, Personal, involves concerns about how the innovation relates to the individual. Stage 3, Management, is reached when the teacher begins to experiment with implementation; at this point, teacher concerns intensify around the logistics and new behaviors associated with putting the change into practice. At Stage 4, Consequence looks at concerns about the effect of the innovation on the students. Stage 5, Collaboration, reflects teacher interest in coordinating with others in using the innovation. Stage 6, Refocusing, involves thinking about making major modifications in the use of the innovation, or perhaps replacing it with something else.

The CBAM Levels of Use focuses on general patterns of teachers' behaviors as they prepare to use, begin to use, and gain experience implementing a classroom change (Hall & Hord, 1987, 2006). Level 0, Nonuse, reflects a state in which the teacher has little knowledge of the change and no plans for its implementation. Level I, Orientation, when she or he decides to seek more information about the change, but has not made a decision to implement it. Level II, Preparation, a teacher is actively preparing to put the change into practice, but has not actually begun to implement it in the classroom. Level III, Mechanical, the teacher begins change implementation. Level IVA, Routine, has been reached when the teacher is comfortable with the change and not planning to amend how it is used. Most teachers settle in at a Routine level of use. Some, however, may actively assess the impact of the innovation on their students and initiate changes in the innovation or their use of it on this basis.

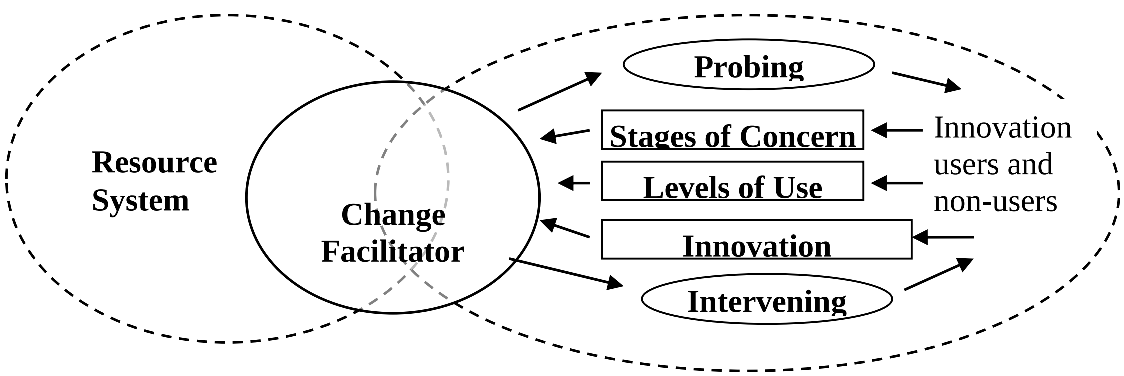

Figure 1. Concerns Based Adoption Model by Hall & Hord (2006)

The CBAM is helpful not only in understanding the change process, but in designing change strategies. An effective change strategy is one that helps teachers through the stages, addressing the seven concerns more or less in sequence (Anderson, 1997). For example, skipping the stage of personal concern, or not giving teachers enough time to work through it makes successful change more difficult. Different concerns always interact and are operationalized by users at different a different points throughout the process. For example, the teachers' knowledge of the innovation grows in the process of implementing the innovation and this may raise or lower personal concerns.

Purpose/Objectives

Results from this study can contribute to a better understanding of the agriculture dual enrollment program secondary teachers', their opinions of course offerings, and the overall agriculture dual enrollment program. The purpose of this study was to understand teacher's perceptions of the New Mexico agriculture dual enrollment program impact on the secondary school and students. Objectives that guided this study include:

1. Determine teachers' perceptions of the impact of the agriculture dual enrollment program to areas of student success.

2. Evaluate teachers' perceptions of impact the agriculture dual enrollment program has on secondary agriculture educators.

3. Evaluate teachers' perceptions of how the agriculture dual enrollment program's presence on a campus influences counselors.

4. Evaluate teachers' perceptions of the overall benefit of the agriculture dual enrollment program to the secondary school campuses.

Methods

This research employed a descriptive study with open ended questions. These research methods sought to overcome weaknesses of a single method (Johnson & Onwuegbuzie, 2004). After IRB approval and individual participant agreement to participate, collection of data began. The sample population for this study was all New Mexico teachers who were currently offering the agriculture dual enrollment courses on their high school campus (N = 34) of the 90 teachers in the state. Researchers received a response rate of 84% (n = 28). Comparison of early and late responders revealed no significant ($p < .05$) differences. Based on this information, the researcher concluded the findings could be generalized to the population (Lindner, Murphy & Briers, 2001).

Quantitative data was collected in relation to teacher's perceptions on the cost and benefits of the dual enrollment program. Teachers were asked to rank the impact of the dual enrollment course offerings on a 1 to 5 scale (1= *strongly disagree* to 5= *strongly agree*). The rating was on the dual credit course offering in relation to areas of student success, impacts on the high school teacher, guidance counselor, campus principal, and secondary school campus as a whole. Teachers were asked open ended questions relating to the impacts on students, themselves as a teacher, the school as a whole, and their overall opinion of the agriculture dual enrollment program. The instrument used for this study was the Teacher Dual Enrollment Impact Survey, developed by the National Association for Concurrent Enrollment Partnerships (NAECP, 2012).

The NACEP is a professional organization with over 200 postsecondary members across the United States. Per NACEP guidelines, none of the essential questions were deleted or modified other than specifying course focus (in this case agricultural science). The validity of this instrument has been established through testing and usage across the country within the National Association for Concurrent Enrollment Partnerships (NACEP, 2011). Chief academic officers at the institution were also given a chance to review drafts of the survey to ensure instrument validity. The reliability of the instrument resulted in a Cronbach's Alpha score of .957 post-hoc evaluation.

Open-ended responses were solicited to investigate program participants' experiences because this method allowed researchers to understand how people "make sense of their world" (VanMaanen, 1979). The researcher concluded that this was appropriate with the CBAM, as change within this model is viewed as "a highly personal experience and involves developmental growth in feelings and skills" (Hall & Hord, 2001). Questions were asked at the end of each likert-type scale. These were reviewed by the researchers and the data analyzed using the constant comparative method (Glaser & Strauss, 1967). This employed unitizing and categorizing of the data. The constant comparative method allowed the researchers to repeatedly compare the responses with previous responses in an attempt to discover new relationships (Dye, Schatz, Rosenberg, & Coleman, 2000). Following the unitizing of the data, the data were coded as part of an audit trail to ensure confirmability (Erlandson, Harris, Skipper & Allen, 1993). The units of data were sorted into emergent categories of participant perceptions.

The researchers used measures of credibility to validate the study. Credibility relates to the level of confidence in the researchers, study design and findings to accurately represent the data (Ary, Jacobs & Sorenson, 2010). Credibility was established through member checks and peer debriefing. Participants were purposely selected for this study based upon their experience teaching and participating in the agriculture dual enrollment program. Although potential exists to transfer this to other settings, the findings of this study are limited to the participants of this study's results in the state of New Mexico.

Findings

Objective one sought to measure the impact of the agriculture dual enrollment program on student success. Table one presents teachers' perception of the perceived impact dual enrollment has on student success.

Table 1

Teachers' Perceptions of the Agriculture Dual Enrollment Program to Student Success

Prompt	*M*	*Mode*	*SD*
Gained an in depth knowledge of agriculture	3.93	4	0.98
Chose to take enrollment courses on campus	3.86	5	1.46
Gained an appreciation for the challenge of college	3.79	4	1.26
Have enrolled in academically challenging courses	3.75	4	0.93
Developed effective time management skills	3.75	4	1.00
Continued learning into their senior year	3.68	4	0.90
Developed effective study habits	3.68	4	1.01
Developed an understanding of their academic skill	3.64	4	0.95
Developed realistic college expectations	3.57	4	1.03
Considered, for the first time, going to college	3.57	4	1.13

Overall teachers agreed that the program had a positive impact on student success. Teachers percieved the largest impact of the agriculture dual enrollment program on students' success was the learning of in-depth agriculture knowledge, staying on campus to get college credit, and gaining an appreciation for the challenge of college courses.

Teachers were also asked the open ended question, "What is the single greatest impact agriculture dual enrollment courses have had on your students?" They responded that involvement in the program led to more students getting involved in more rigorous courses, different types of students getting involved, encouraged students to stay in school, and gave high school agriculture students the opportunity to start college early. Selected teacher comments include:

"Many of these students were the first in their family to take college course or even consider going to college. They never thought about it until taking these courses."

This program encourages students to stay in school and take a serious look at post-secondary education."

Several teachers expressed that the program was a benefit to students' understanding of college rigor, gaining confidence in their academic skills, allowing high school students more elective options, positively impacting student's work ethic, helped them tie material to real world skills, as well as helping them to meet state standards for graduation.

The **second objective** was to determine the perceived benefit of the agriculture dual enrollment to secondary school teachers. Table two provides detail on these findings.

Table 2

Perceived Benefits of the Agriculture Dual Enrollment Program to Secondary Teachers

Prompt	*M*	*Mode*	*SD*
Was supported by the dual university liaison	3.96	4	1.17
Established higher standards for student work	3.89	4	1.03
Found the job more satisfying	3.71	4	1.08
Was more connected with my discipline	3.64	3	1.03
Found dual content useful in non-dual courses	3.61	4	0.99
Learned about new ideas in my discipline	3.61	4	1.07
Increased critical thinking skills taught in my courses	3.61	4	1.26
Learned new instructional strategies	3.57	4	1.07
Have been energized as a teacher	3.46	3	1.17
Taken leadership positions within the school	3.43	3	1.17
Developed better understanding of college expectations	3.32	3	0.95
Found it more difficult to fulfill other responsibilities	2.61	2	1.17
Have been released from other school duties	2.50	2	1.26

It was found that high school teachers perceived the agriculture dual enrollment program was a benefit to them personally. Teachers indicated that this program had the most impact on their ability to establish higher standards for student work, making their job more satisfying, and by helping them to feel more connected to their discipline. It was found that teachers felt supported by the university liaisons for the dual enrollment program. Overall, they did not indicate that their participation in the agriculture dual enrollment program took away from other duties, nor did it result in them being released from other school duties.

When asked, “What is the single greatest impact the agriculture dual enrollment program has had on you as the teacher?” teachers reported a variety of impacts this program had on them as a teacher. Some of the perceived impacts of the agriculture dual enrollment program included more students getting involved and an increased motivation as a teacher. Multiple participants noted that the program increased the rigor in their teaching and their knowledge of new agricultural technologies. Several teachers expressed that it opened up more teaching options for them. Two of the more experienced teachers wrote.

“It has allowed me to view myself in a different way and evaluate myself as an educator in order to improve my craft.”
“It has inspired me the continue learning and stay up with current information and trends.”

Objective three sought to evaluate teacher's perceptions of how dual enrollment's presence on a campus influenced counselors. Table three details how teachers recognized this program impacted school counselors' decisions.

Table 3

Perceived Impact of the Agriculture Dual Enrollment Program on School Counselors

Prompt	*M*	*Mode*	*SD*
Perceived more students as capable of higher levels of academic achievement	2.79	4	1.62
Increased their knowledge of current college requirements	2.79	4	1.66
Developed a better understanding of skills students need to succeed in college	2.71	4	1.58
Changed the way they present college options to students	2.61	4	1.85
Enrolled more students in my agriculture science class	2.39	4	1.77

Teachers' perception of impact the dual enrollment program had on school counselors was found to have the lowest average of all of the areas of impact. Teachers disagreed that the agriculture dual enrollment program had an impact on the way counselors enrolled students in their classes or the way they presented college options to students over other areas. These were also the areas found to have the most variability in their responses (Table 3).

The **fourth objective** was to assess teacher's perceptions of the benefits of the agriculture dual enrollment program to the overall secondary campus. These findings are presented in Table four.

Table 4

Perceived Benefit of the Agriculture Dual Enrollment Program to the Overall Secondary Campus

Prompt	*M*	*Mode*	*SD*
Enhanced its prestige and academic reputation	3.61	4	1.32
Progressed in meeting its goal of offering rigorous courses	3.57	4	1.23
Demonstrated to parents that their students are doing challenging work	3.57	4	1.29
Offers perquisite courses for agriculture dual enrollment that are appropriate	3.50	4	1.20
Raised expectations for student performance	3.39	4	1.17

When determining teachers' perceptions of the dual enrollment program's impact on the overall secondary campus, teachers agreed that it had a positive impact. They felt the strongest impacts of the program were in the areas of enhanced prestige and reputation of the high school campus. The program was shown to have a positive impact on courses being more rigorous and demonstrated to parents that their students were taking part in challenging school work.

Participants were also asked the open ended question, "What is the single greatest impact the agriculture dual enrollment program has had on your school?" A majority of teachers expressed an opinion that it increased the school and program prestige, as well as increased the school score on the state grading system. Some of the perceived benefits of this program was that it established a positive relationship between the high school, the agriculture program and the university. Teachers noted that it has led to increased parent and community support. Two of our teachers who had worked with this program for the last two to three years replied

"It gives the community a different view of our school. It gives parents and the community ideas about what our school has to offer our students."
"This has been a selling point for many of the electives and it also has made an impact on the student work in all classes."

The final question of this study's survey questionnaire was an open-ended response asking, "What are some challenges that you have seen from your involvement with the agriculture dual enrollment program?" Teachers expressed that some possible challenges they faced include: getting all students interested in the courses, aligning lab activities to match the college course material, finding time to develop lab activities that fit with dual enrollment agriculture courses and that they would like to have more resources from the university in regards to technology.

Conclusions

The researchers found that overall teachers perceived that the agriculture dual enrollment program had a positive impact on students, teachers, and the secondary campus as a whole. An affirmative effect was also found for the communities' perceptions of the agriculture program and high school course rigor after dual enrollment participation, similar to findings by Hughes (2010). These findings are comparable to previous research on the benefits of dual enrollment courses (Bailey & Karp, 2003; Barnett & Hughes, 2010). The agriculture dual enrollment program leaders were validated in their goals to develop solid foundations with teachers by the constructive comments made within the open-ended questions. The positive impact to the campus as a whole is a major part of change adoption within the CBAM (Hall & Hord, 2001). One of the primary principles of this model is that the context of the school influences the process of change. The teachers' comments backed up these findings as well as provided some more detail in how exactly they were impacted in these areas.

Based on the teachers' comments, in regards to stages of concern, teachers were found to be between Stage 3, Management, when the teacher begins to experiment with implementation and Stage 4, consequence. The Consequence stage is when the teacher concerns focus predominantly on the impact of the change on students in the high school classrooms and on the possibilities for modifying the innovation or their use of it to improve its effects. In regard to the framework levels of use, teachers were found to be at level IVA, routine. This involves teachers establishing a pattern of regular use and making few changes and adaptations in use of the innovation. This is reflected in the moderately positive responses. On a 1 to 5 scale, mean scores in the 3 (neutral) to 4 (agree) range were viewed as moderately positive. This indicates that there is still work to be done to support teachers in their adoption of the agriculture dual enrollment program. Based upon these findings, caution should be taken when making inferences beyond the sample population.

Teachers did not feel that the program had a highly positive impact on the way counselors perceived their programs or worked with their students. These findings were counter to the findings of Medvide & Blustien (2010). The findings of this study suggested that teachers' sensed counselors were at the lowest levels of concern and levels of use, *awareness* and *nonuse*, respectively. These findings may be due to counselors having limited contact with university agriculture dual enrollment liaisons. By addressing the early stages of concern related to *awareness* and *informational*, the researchers can successfully reach the later stages of *collaboration*. As the school counselors advance through the stages of CBAM, they would become adopters and advocates of the agriculture dual enrollment program.

Recommendations for Practice

It is suggested that continued professional development should be offered focused on the training of new teachers and experienced teachers as they possibly enter the higher stages of concern which involve refocusing and the consideration of making major modifications in the use of the innovation. This is suggested because, even with moderate to high overall opinion scores from teachers, only slightly over one-third of the high school agricultural science programs in the state are taking advantage of this unique program offering. As mentioned earlier in the conclusions, teachers are still in the early stages of the CBAM and must be supported through the development and further adoption of the agriculture dual enrollment program. This should include the development of suggested lab activities to address some of the comments made by participants. These trainings can help the high school instructors create the necessary college-like atmosphere and assist in pedagogical strategies necessary for student success.

Dual enrollment program directors are encouraged to develop and present a professional development workshop for school counselors to increase their level of understanding and adoption of the agriculture dual enrollment program. This was important, as the level of counselors' support was the construct that had the lowest average scores perceived by teachers. Using the CBAM, counselors need to be better informed through appropriate professional development before they can advance further along the spectrums for levels of concern and levels of use. As noted within CBAM, an organization does not change until the individuals within it change (Hall & Hord, 2006).

The best way to offer this professional development, that would reach the largest audience, is by offering it at the annual New Mexico agricultural science teachers' conference. It is also suggested that professional development be offered for campus administrators. In chapter one of their book, Hall and Hord (2001) list 12 principles of change within an educational

CBAM, one of which, is that administrator support is vital to long term educational program change and adoption.

Recommendations for Research

It is clear that research must be continued on the study of barriers and what influences teachers' adoption of the agriculture dual enrollment courses, guided by the CBAM. Research focused on the pedagogical approaches of these course offerings, both from the university instructor and the secondary agriculture science teacher's perspectives, would benefit the creation of high quality agriculture dual enrollment courses. It is suggested that researchers continue studying the benefit of students' participation in the dual enrollment program on college entrance and success in higher education. Research should also be done regarding the reasons students take dual enrollment courses and the ultimate career paths of these program participants. To develop a program that is available to a wide range of learners, while maintaining high standards for course accountability, more research should be done to find how well these programs address student variances including; attitude, learning style and autonomy. It is also suggested that a similar study be conducted with school administrators and school counselors to gauge their perceived levels of use and stages of concern in regards to the agriculture dual enrollment program.

References

Adelman, C. (2006) *The toolbox revisited: Paths to degree completion from high school through college*. Washington, DC: U.S. Department of Education, Office of Vocational Education.

Anderson, S. E. (1997). Understanding teacher change: Revisiting the concerns based adoption model. *Curriculum Inquiry*, 27, 331-367.

American Graduation Initiative (2014) Retrieved from http://www.americangraduate.org/about/about-the-initiative.html Bill and Melinda Gates Foundation

Andrews, H. A. (2001) *The dual credit phenomenon! Challenging secondary school students across 50 states.* Stillwater, OK: New Forums Press.

Ary, D., Jacobs, L. C., & Sorenson. (2010) *Introduction to research in education* (8th ed.) Belmont, CA: Thomson Wadsworth

Bailey, T. R., & Karp, M. M. (2003). *Promoting college access and success: A review of credit-based transition programs.* Washington, DC: U.S. Department of Education. Retrieved from ERIC database. (ED482497)

Bailey, T. R., Hughes, K. & Karp, M. M. (2005) *What role can dual enrollment programs play in easing the transition between high school and postsecondary education?* Washington, DC: Office of Vocational and Adult Education, U.S. Department of Education (U.S. Department of Education Publication No. ED-99-CO-0160)

Baker, L. M., Settle, Q., Chiarelli, C., & Irani, T. (2013). Recruiting strategically: Increasing enrollment in academic programs of agriculture. *Journal of Agricultural Education 54* (3), 54-66 doi: 10.503/jae.2013.03054

Barnett, E., & Hughes, K. (2010). *Issue brief: Community college and high school partnerships.* New York, NY: Community College Research Center, Columbia University. Retrieved from ERIC database. (ED512397)

Barnett, E. & Stamm, L. (2010) *Dual enrollment: A strategy for educational advancement of all students*. Retrieved from www.blackboardinstitute.com/pdf/Bbinstitute_DualEnrollment

Burns, H., & Lewis, B. (2000). Dual-Enrolled students' perceptions of the effect of classroom environment on educational experience. *The Qualitative Report, 4.* Retrieved from http://www.nova.edu/ssss/QR/QR4-l/bums.html

Doerfert, D. L. (Ed.) (2011). *National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015*. Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications.

Dye, J. F., Schatz, I. M., Rosenberg, B. A., & Coleman, S. T. (2000). Constant comparison method: A kaleidoscope of data. *The Qualitative Report, 4*(1/2). Retrieved from www.nova.edu/ssss/QR/QR4/dye.html

Edwards, L, Hughes, K. L. & Weisberg, A. (2011) Different approaches to dual enrollment: Understanding program features and their implications. Community College Research Center, Columbia University. James Irvine Foundation, San Francisco, CA

Erlandson, D. A., Harris, E. L., Skipper, B. L., & Allen, S. D. (1993). *Doing naturalistic inquiry.* Newbury Park, CA: SAGE.

Estación, A., Cotner, B. A., D'Souza, S., Smith, C. S., & Borman, K. M. (2011). *Who enrolls in dual enrollment and other acceleration programs in Florida high schools? Issues & answers.* REL 2012-No. 119. Regional Educational Laboratory Southeast. (ED526313)

Farrell, P. & Siefert, K. (2007). Lessons learned from a dual enrollment partnership. *New Directions for Community Colleges, 139*, 69-77. doi:10.1002c/cc.294

Glaser, B. & Strauss, A. (1967). *The discovery of grounded theory: Strategies of qualitative research.* London, UK: Wiedenfeld & Nicholson.

Goecker, A. D., Smith, P. G., Smith, E. & Goetz, R. (2010) *Employment opportunities for college graduates in food, renewable energy and their environment: United States*, 2011-2015

Ha11, G., & Hord, S. (1987). *Change in schools: Facilitating the process.* Albany, NY: State University of New York Press.

Hall, G. E., & Hord, S. M. (2001). *Implementing change: Patterns, principles, and potholes*. Boston, MA: Allyn and Bacon.

Hall, G. E., & Hord, S. M. (2006). *Implementing change: Patterns, principles and potholes* 3rd Edition. NewYork, NY: Pearson Education.

Hughes, K. L. (2010). Dual enrollment: Postsecondary/secondary partnerships to prepare students. *Journal of College Science Teaching, 59*(6), 12-13.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33*(7), 14-26. doi: 10.3102/0013189x033007014

Karp, M., Bailey, T., Hughes, K., & Fermin, B. (2005). Update to state dual enrollment policies: Addressing access and quality. Washington, DC. U.S. Department of Education: Office of Adult and Vocational Education

Karp, M. M., Calcagno, J. C., Hughes, K. L., Jeong, D., & Bailey, T. R. (2007). *The postsecondary achievement of participants in dual enrollment: An analysis of student outcomes in two states.* Community College Research Center, Columbia University.

Kim, J., Kirby, C., & Bragg, D. D. (2004). *Dual credit: Then and now*. In Brief. Office of Community College Research and Leadership. Retrieved from ERIC database. (ED495242)

Klein, A. (2007) Acceleration under review. *Education Week, 26* (44) 22-24. Retrieved from www.edweek.org/ew/aticles/2007/44dualenrollment.html

Le, C. & Frankford, J. (2011) *Accelerating college readiness: Lessons from North Carolina's innovator early colleges*. Boston, MA: Jobs for the Future.

Linder, J. R., Murphy, T. H., & Briers, G. E. (2001) Handling nonresponse in social science research. *Journal of Agricultural Education, 42*(4), 43-52.

Mead, R. A. (2009) *A comparison of the enrollment and academic success of dual credit and non-dual credit students*. (Unpublished Doctoral Dissertation) Iowa State University, Ames, IA. UMI

Medvide, M., & Blustein, D. L. (2010). Exploring the educational and career plans of urban minority students in a dual enrollment program. *Journal o f Career Development, 37,* 541- 558. doi: 10.1177/0894845309350920

Menzel, M. (2006). Type III concurrent enrollment program participation effect on time and cost to baccalaureate degree completion. *Dissertation Abstracts International, 67*(1)

Morrison, M. C. (2008*). The benefits of acceleration-baccalaureate advantages*. Mason City, IA: North Iowa Area Community College.

National Association of Concurrent Enrollment Partnerships (2011). Retrieved from http://www.nacep.org/research-policy/legislation-policy/

National Center for Education Statistics (2011) *The Condition of Education 2011*. Washington, DC: U.S. Department of Education

Picciano, A. G., and J. Seaman. 2009. *K–12 online learning: A survey of U.S. school district administrators*. Boston: Sloan Consortium.

New Mexico Public Education Department (2013). Retrieved from http://www.ped.state.New Mexico.us/dualcredit/

Stillwell, R., Sable, J., & Plotts, C. (2011). *Public school graduates and dropouts from the common core of data: School year 2008–09* (NCES 2011-312). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved from http://nces.ed.gov/pubsearch.

Swanson, J. (2008). An analysis of the impact of high school dual enrollment course participation on post-secondary academic success, persistence and degree completion. *Dissertation Abstracts International: Section A. Humanities and Social Sciences,* AAT 3323472.

Sweeny, B. (2003). *CBAM: A model of the people development process*. Retrieved from http://www.mentoring-association.org/membersonly/CBAM.html

VanMaanen, J. (1979). Reclaiming qualitative methods for organizational research: A preface. *Administrative Science Quarterly, 24* (4), 520-526. Retrieved from www.jstor.org/stable/2392358

Winograd, P. & Sallee, C. (2011) Students at the Crossroads: A Study of New Mexico's 12th Grade. Prepared for the State Legislative Finance Committee; June 15th, 2011

Yasar, S. (2002). Impact of involvement in a science fair on seventh grade students' understanding of scientific method and attitudes toward science. Arizona State University, AZ (Thesis).

Competent and Committed Agriculture Teachers: Exploring the Role of Perceived Competence in Career Commitment

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Abstract

The success of education depends on highly competent teachers committed to the profession. In agricultural education, the need for teachers committed to the profession is exacerbated by the identified shortage of teachers. Previous research in agricultural education has identified a link between teachers' competence, most commonly operationalized as self-efficacy, and their commitment to the teaching profession. However, research has not explored the relationship between agricultural education specific competence areas and career commitment. This study explored the relationship between four teacher competence areas in agricultural education (i.e. intra-curricular facilitation, pedagogical knowledge, program management, and technical knowledge) and agriculture teachers' career commitment. Responding teachers' competence in the four areas were compared by career phase. Statistically different levels of intra-curricular competence were identified due to career phase; therefore, career phase was considered in our analysis of the relationship between competence and career commitment. The model of agriculture teachers' career commitment was statistically significant using the four competence areas as predictor variables. One of the competence variables, technical knowledge, was identified as a significant predictor of career commitment. The findings from this study are discussed along with implications for teacher education and recommendations for further research.

Introduction and Theoretical Framework

Recruiting and retaining highly competent, highly committed teachers is one of the foundational objectives of the agricultural education profession (Kantrovich, 2010; Myers, Dyer, & Washburn, 2005). While the crux of this objective includes both recruitment and retention, this study focused on the retention aspect. More specifically, the purpose of this exploratory research was to analyze the relationship between agriculture teachers' perceived competence and their commitment to stay in the agricultural education profession. By exploring this relationship, we sought to provide critical insight into potential reasons why some agriculture teachers have a lower commitment to the agriculture teaching profession (Kantrovich, 2010).

The need for research into agriculture teachers' career commitment stems from the vulnerability of the profession to a "significant shortage of qualified teachers" (Kantrovich, 2010, p. 43). The continual shortage of agriculture teachers is limiting the growth and overall positive impact of the agricultural education profession. The teacher shortage issue is not unique to the agricultural education profession (Grissmer & Kirby, 1987; Ingersoll, 2001; Shen, 1998), and a growing body of literature has explored reasons behind this issue. Research in teacher shortage has identified two consistent variables influencing teachers' decisions to leave the profession; individual teacher characteristics and career stage (Grissmer & Kirby, 1987; Ingersoll, 2001; Shen, 1998). Included in the individual teacher characteristics found to influence teachers' decision to leave the profession is their teaching competence.

Throughout the field of education, there is interest in understanding teacher competence and the ramifications of this competence (Roelofs & Sanders, 2007). A competent teacher is an individual with the knowledge and skills necessary to produce the desired learning outcomes among students (Medley & Shannon, 1994; Mulder, Weigel, & Collins, 2006). Competent teachers are better able to facilitate an environment of successful learning experiences for their students (Mulder et al., 2006; Roelofs & Sanders, 2007; Woolfolk Hoy, 2000). An important distinction is made in the literature on teacher competence. Teacher competence refers to a teacher's knowledge and skills in a broad category of teaching. Alternatively, an individual competency is a specific skill nestled within a broad competence area. The diverse nature of the agricultural education discipline requires teachers with a range of competencies in multiple competence areas (De Lay & Washburn, 2013; Phipps, Osborne, Dyer, & Ball, 2007), including intra-curricular facilitation, pedagogy, program management, and technical knowledge. We acknowledge there are additional competence areas within the agriculture teaching profession. However, given the exploratory nature of this study, we feel the four we have identified encompass the primary competence areas of agricultural education. Moving forward, we will delineate these four competence areas and provide examples of specific competencies within each area.

Competence in intra-curricular facilitation includes teachers' knowledge and abilities facilitating FFA opportunities and Supervised Agricultural Experiences (SAE). An example of an individual competency within intra-curricular facilitation is a teacher's ability to train career development teams. Pedagogical competence refers to a teacher's ability and knowledge connecting classroom strategies to the needs of every student while accomplishing desired learning outcomes. An example competency within the pedagogical arena is a teacher's ability to manage student behavior. Competence in program management entails an agriculture teacher's knowledge and ability facilitating the broad range of experiences within an agricultural education program. Examples of program management competencies include planning field trips, utilizing an advisory committee, and conducting adult programs. Agriculture teachers' technical competence refers to their knowledge and abilities related to the broad range of agricultural course offerings. An example competency within the technical competence domain is an agriculture teacher's ability to teach an animal science course.

As we stated, the purpose of this study was to explore the relationship between agriculture teachers' perceived competence and career commitment. The theoretical foundation for this exploration is based in Bandura's Theory of Self-Efficacy (1986, 1977). Bandura operationalized self-efficacy as an individual's confidence in their abilities to successfully accomplish a given task. One of the most intriguing aspects of Bandura's theory is the proposed relationship between self-efficacy and commitment to a given task (Coladarci, 1992). Bandura posited that an individual more confident in their abilities (i.e. higher perceived competence) is more likely to perceive challenges associated with a task as surmountable; therefore, this individual will have higher levels of commitment to the task. Alternatively, an individual with lower levels of confidence in their abilities (i.e. lower perceived competence) will have lower commitment to the task because they are unsure of their abilities to overcome perceived challenges. Building off this theoretical foundation, we propose those agriculture teachers with higher perceived competence in intra-curricular facilitation, pedagogy, program management, and technical knowledge will be more committed to the agricultural education profession. A conceptual model of the proposed relationship is provided in Figure 1.

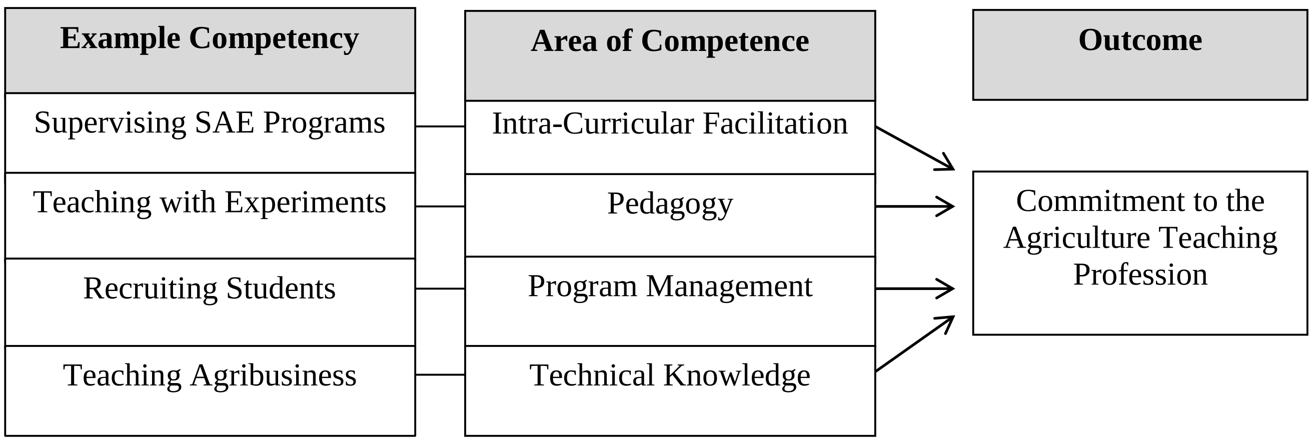

Figure 1. Conceptual model of the relationship between agriculture teachers' competence and career commitment.

Literature Review

We conducted a thorough literature review to explore the diverse nature of teacher competence in agricultural education as well as the existing body of literature exploring the career commitment of secondary agriculture teachers. Our synthesis of this literature led to three prevalent categories for review: teacher competence, teacher career commitment, and the relationship between perceived competence and career commitment.

Teacher Competence

Two strands of agricultural education research, needs assessments and teacher self-efficacy, have addressed the concept of teacher competence. Needs assessment research considers both perceived importance and competence within a variety of teacher competencies to identify professional development needs among teachers (Borich, 1980). Teacher self-efficacy research directly assesses competence by analyzing a teacher's "judgment of his or her capabilities to bring about desired outcomes" (Tschannen-Moran & Woolfolk Hoy, 2001, p. 783). Within this review we will synthesize both needs assessments and self-efficacy literature as they pertain to teacher competence in agricultural education.

Multiple needs assessment studies have identified high needs among agriculture teachers in areas related to pedagogical competence, including motivating students to learn (Duncan, Ricketts, Peake, & Uesseler, 2006; Garton & Chung, 1996), managing student behavior (Duncan et al., 2006; Sorensen, Tarpley, & Warnick, 2010), teaching students with special needs (Duncan et al., 2006; Sorensen et al., 2010), and using technology as a teaching tool (Edwards & Briers, 1999; Garton & Chung, 1996; Joerger, 2002; Layfield & Dobbins, 2002). Likewise, needs assessment research has consistently identified high needs for competencies related to intra-curricular facilitation, including facilitating SAE recordkeeping skills (Duncan et al., 2006; Layfield & Dobbins, 2002; Sorensen, Lambert, & McKim, 2014; Sorensen et al., 2010), completing FFA or proficiency award applications (Duncan et al., 2006; Garton & Chung, 1996; Layfield & Dobbins, 2002; Sorensen et al., 2010), and supervising or developing SAE opportunities for students (Duncan et al., 2006; Garton & Chung, 1996; Layfield & Dobbins, 2002; Sorensen et al., 2010). Research has also identified program management as a consistent need among agriculture teachers, with specific competencies including developing effective public relations (Duncan et al., 2006; Garton & Chung, 1996; Layfield & Dobbins, 2002), utilizing advisory committees (Duncan et al., 2006; Garton & Chung, 1996; Sorensen et al., 2014; Sorensen et al., 2010), managing adult education programs (Edwards & Briers, 1999; Garton & Chung, 1996; Layfield & Dobbins, 2002), and completing reports and programmatic paperwork (Garton & Chung, 1996; Layfield & Dobbins, 2002). Additionally, needs assessment research has identified competencies related to technical knowledge as being high need areas, examples include teaching biotechnology (Duncan et al., 2006), veterinary technology (Duncan et al., 2006), agricultural mechanics (Sorensen et al., 2014), and agribusiness (Layfield & Dobbins, 2002). Needs assessment research in agricultural education has underscored the value of continual research addressing pedagogical competence, intra-curricular facilitation, program management, and technical knowledge. The consistent identification of competencies related to these four areas supports the inclusion of these variables when exploring the relationship between competence and commitment.

Several studies in agricultural education have explored the concept of self-efficacy. Self-efficacy is directly related to teachers' perceived competence in a given area. Duncan and Ricketts (2006) examined the self-efficacy of agriculture teachers in four areas: technical content knowledge, FFA/SAE/Leadership development, program management, and teaching and learning. Results from this study revealed traditionally certified teachers had significantly higher self-efficacy in technical content knowledge, FFA/SAE/Leadership development, and program management when compared to alternatively certified teachers. The research of Duncan and Ricketts (2006) provided one of three examples in agricultural education of breaking down teacher self-efficacy into specific aspects of an agriculture program. Wolf (2008, 2011) and Hartfield (2011) also explored specific areas of self-efficacy: FFA, SAE, and classroom. This research revealed that teachers evidenced the highest self-efficacy in the classroom domain and the lowest in the SAE domain (Wolf, 2008, 2011) and experienced teachers reported higher self-efficacy in each of the three domains when compared to teachers with less than five years of experience (Hartfield, 2011).

The research of Wolf (2008), Duncan and Ricketts (2006), and Hartfield (2011) provide an excellent foundation for this study. All three began an exploration of self-efficacy in regards to specific program components which are key areas for competence within agricultural education. In this research, we are building on the specific program components of intra-curricular facilitation, pedagogy, program management, and technical knowledge as we explore their relationship to career commitment.

Teacher Career Commitment

A teacher’s career commitment is vital to strengthening performance and reducing turnover (Hausman & Goldring, 2001). Additionally, commitment to teaching is an indicator of a teacher’s connection to the teaching profession (Coladarci, 1992) and their willingness to create curricular changes and enact change within their discipline (Firestone & Pennell, 1993). The range of variables influencing teachers’ career commitment is noteworthy. Mee and Haverback (2014) conveyed that teachers who felt confident within their subject area still had contemplated leaving their job due to classroom management issues, curriculum delivery competence, and classroom organization issues.

Many agriculture teachers come into the teaching profession and leave soon after (De Lay & Washburn, 2013). Across all discipline areas, about a quarter of all teachers leave the profession within the first two years and up to half leave within the first five years (Ingersoll & Smith, 2003). In a national assessment of agriculture teachers, Warnick, Thompson, and Tarpley (2010) found that only one-third of first year agriculture teachers reported being highly likely to remain in the profession for more than five years. During those first five years, agriculture teachers are faced with many challenges and heavy demands that may contribute to their decision to leave the profession (Myers et al., 2005; Osborne, 1992). However, success in retaining agriculture teachers can yield numerous benefits including program continuity, sustained success, and depth of student development (Ingersoll & May, 2010; Robinson & Edwards, 2012).

Relationship between Teacher Competence and Career Commitment

As we’ve established, teacher turnover is a major concern throughout education (Ingersoll, 2001). An adequate supply of highly competent and committed teachers is needed for program and student success. In order to understand teachers’ commitment to the teaching profession, researchers have turned to the theoretical link between an individual’s confidence in their abilities to accomplish a given task and their commitment to that task, a link largely driven by self-efficacy research (Bandura, 1986, 1977). In agricultural education, this link has been explored by a number of researchers (Blackburn & Robinson, 2008; Knobloch & Whittington, 2003; Swan, 2005; Wheeler & Knobloch, 2006). These studies support the connection between agriculture teachers’ competence, operationalized as self-efficacy, and their career commitment. However, the research in agricultural education is limited in the areas of self-efficacy explored. The majority of studies have explored the relationship between general teaching efficacy and career commitment (Knobloch & Whittington, 2003; Swan, 2005; Wheeler & Knobloch, 2006), with one study exploring the relationship between teachers’ self-efficacy in student engagement, instructional practices, classroom management, and their career commitment (Blackburn & Robinson, 2008). While these studies provide valuable insight into the relationship between self-efficacy and career commitment, they lack agricultural education specific competence areas and their relationship with career commitment. This study sought to address this gap in the literature by exploring the relationship between agriculture teachers’ competence in intra-curricular facilitation, pedagogy, program management, technical knowledge, and their career commitment.

Purpose and Research Objectives

The purpose of this study was to explore the relationship between agriculture teachers' career commitment and their competence in intra-curricular facilitation, pedagogy, program management, and technical knowledge. Priority area number three of the National Research Agenda identifies the need for a "sufficient and scientific professional workforce" (Doerfert, 2011) in agriculture. Secondary agriculture teachers are needed to empower and encourage students to consider careers in the agriculture workforce. Therefore, the purpose of this study is aligned with the National Research Agenda. In order to accomplish this purpose, the following research objectives were developed.

1.) Describe the sample of agriculture teachers.
2.) Compare teachers' perceived competence in intra-curricular facilitation, pedagogy, program management, and technical knowledge by career phase.
3.) Compare teachers' career commitment by career phase.
4.) Describe the relationship between agriculture teachers' perceived competence and career commitment.

Methods

The study population consisted of Oregon secondary agriculture teachers (N = 111) during the 2013-2014 school year. Contact information was obtained from the Oregon Agriculture Teacher Directory and was vetted by a panel of agricultural education experts for accuracy. We attempted a census of all secondary agriculture teachers in the state by sending an electronic survey through the program Qualtrics. We utilized five points of contact to elicit and gather responses from participants (Dillman, 2007). The first four points of contact were made through e-mail. For the final point of contact with participants, we obtained a random sample of non-responders and attempted to contact them by phone (Lindner, Murphy, & Briers, 2001; Miller & Smith, 1983). We received 80 usable responses, for a response rate of 72%. We checked for non-response bias by comparing on-time responders to late responders (Lindner et al., 2001; Miller & Smith, 1983). Late responders were classified as individuals who responded after the last two points of contact. We found no differences between on-time and late responders for the variables of interest. Therefore, we did not consider non-response bias to be an issue in this study and treated non-responders as a sample of the total population (Linder et al., 2001; Miller & Smith, 2003).

The instrument was examined for content and face validity by a panel of experts in the field of agricultural education. As part of a larger study, the instrument contained constructs measuring agriculture teachers' career commitment as well as perceived agriculture teacher competence in four different areas: intra-curricular facilitation, pedagogy, program management, and technical knowledge. The reliabilities of each construct were analyzed using Cronbach's alpha and are reported in Table 1.

Table 1

Reliability Coefficients of Constructs for the Current Study

Construct	α
Intra-Curricular Facilitation	.85
Pedagogy	.82
Program Management	.86
Technical Knowledge	.77
Career Commitment	.84

The career commitment construct was developed from the eight-item professional commitment scale (Blau, 1985). This scale was designed to measure professional commitment, described as an individual's identity with and value toward their profession (Blau, 1985). Although professional commitment differs from teachers' turnover intentions, it has been shown to be a reliable predictor of teacher turnover (Blau, 1985, 1988, 1989; Chapman, 1983; Raju & Srivastava, 1994; Singh & Billingsley, 1996). The professional commitment scale has been used in a variety of other studies, including research with teachers, and has been found to be reliable, with Cronbach's alpha coefficients ranging from .76 to .92 (Blau, 1988, 1989; Goulet & Singh, 2002). In this study, professional commitment was measured on a seven-point scale, ranging from 1 "Strongly Disagree" to 7 "Strongly Agree."

The four constructs measuring perceived teacher competence (i.e. intra-curricular facilitation, pedagogy, program management, and technical knowledge) were developed as part of a larger study. Items were derived from previous literature (Boone & Boone, 2007; Duncan et al., 2006; Garton & Chung, 1996; Layfield & Dobbins, 2002; Mundt & Connors, 1999; Myers et al., 2005; Sorensen et al., 2010) and categorized into the four competence areas by the researchers of this study. Each construct was measured on a five-point scale, ranging from 1 "Very Low" to 5 "Very High," with higher scores indicating higher perceived competence. For the intra-curricular portion of the instrument, respondents were asked about their ability to facilitate FFA and SAE activities. Sample items included their ability in "training CDE teams" and "supervising students' SAE programs." The pedagogy construct consisted of items pertaining to classroom teaching methods and pedagogy. Sample items included teachers' ability in "teaching with experiments," "evaluating student performance," and "managing student behavior." The program management construct consisted of items related to an agriculture teachers' ability to manage an agriculture program. Sample items included teachers' perceived ability "utilizing a local advisory committee," "maintaining agricultural equipment," and "recruiting students." Finally, the technical knowledge construct consisted of items pertaining to agriculture teachers' ability to teach different technical areas of agriculture. Sample items included agriculture teachers' perceived ability in "teaching agribusiness" and "teaching about public issues regarding agriculture."

Data were imported into the Statistical Package for the Social Sciences (SPSS) version 20.0 for analysis. Research objective one was demographic in nature; therefore, frequencies, means, and percentages were reported. In objectives two and three, we compared agriculture teachers' perceived competence and career commitment across three career phases (early-career, mid-career, and late-career); therefore, we utilized a one-way analysis of variance (ANOVA) for this analysis. We considered early-career teachers as those with zero to five years of experience, mid-career teachers as those with six to 19 years of experience, and late-career teachers as those with 20 or more years of experience. Effect sizes were calculated for the differences among career stage groups. The effect levels used in this study were established by Cohen (1988) at small effect, $\eta = .100$; medium effect, $\eta = .243$; and large effect, $\eta = .371$.

For the fourth objective, we sought to describe the relationship between agriculture teachers' perceived competence and career commitment. To accomplish this objective, a multiple linear regression was performed. Agriculture teacher competence (i.e. intra-curricular facilitation, pedagogy, program management, and technical knowledge) as well as the career stage variables were simultaneously entered into the regression model. Standardized betas for each entered variable and an overall R^2 for the model were calculated and reported. No attempt was made to generalize the findings of this study beyond the population of Oregon agriculture teachers.

Findings

The first objective in this analysis was to describe the sample of agriculture teachers. The sample consisted of a slight majority of male agriculture teachers ($f = 44$; 55.70%). The average age of teachers in this sample was just over 38 years old ($M = 38.28$) with a range of ages from 23 to 65 years old. The largest career phase group included teachers in the mid-career stage (6-19 years of experience; $f = 33$; 44.00%), followed by early career teachers (0-5 years of experience; $f = 27$; 36.00%), and late career teachers (20 or more years of experience; $f = 15$; 20.00%). The large majority of teachers had been traditionally certified to teach agriculture ($f = 66$; 83.50%). On average, teachers had taught agriculture for just over 11 years ($M = 11.11$) with a range of teaching experience from one to 33 years.

The second objective of this study was to compare agriculture teachers' perceived competence in intra-curricular facilitation, pedagogy, program management, and technical knowledge by career phase (see Table 2). Career phase was included as an independent variable due to the identified importance of career stage on teachers' competence and career commitment (Ingersoll, 2001). Additionally, identified differences in competence by career stage would merit the inclusion of the career phase variable in the final model exploring the relationship between career commitment and teacher competence.

Table 2

Comparison of Perceived Competence and Career Commitment by Career Phase

	Career Phase[c]						
Variables	Early	Mid	Late	Total	*F*-value	*p*-value	Eta (η) effect size
Intra-Curricular Facilitation[a]	2.96[d]	3.06[de]	3.43[e]	3.10	3.50	.036	.30
Pedagogy[a]	3.44	3.53	3.53	3.50	0.37	.694	.10
Program Management[a]	3.16	3.29	3.49	3.28	2.04	.138	.23
Technical Knowledge[a]	3.21	3.18	3.29	3.21	0.30	.742	.09
Career Commitment[b]	5.04	4.83	5.33	5.00	0.98	.380	.16

Note. Means with different superscripts in each row are significantly different at $p < .05$ based on Scheffe post-hoc test for unequal variances.
[a]Competence items scaled from 1 "Very Low" to 5 "Very High." [b]Career Commitment items scaled from 1 "Strongly Disagree" to 7 "Strongly Agree." [c]Early career teachers include those with zero to five years of experience, mid-career teachers include those with six to 19 years of experience, and late career teachers include those with 20 or more years of experience.

Late career teachers perceived the highest level of competence in intra-curricular facilitation (*M* = 3.43), pedagogy (*M* = 3.53), program management (*M* = 3.49), and technical knowledge (*M* = 3.29). Early career teachers reported the lowest perceived competence in three of the four areas, with the one exception being technical knowledge, in which mid-career teachers perceived the lowest competence. Comparing across competence areas, teachers perceived the highest overall competence in pedagogy (*M* = 3.50) followed by program management (*M* = 3.28), technical knowledge (*M* = 3.21), and intra-curricular facilitation (*M* = 3.10).

The results of the ANOVA indicated no statistical differences in pedagogical competence (*F* = 0.37; *p*-value = .694), program management competence (*F* = 2.04; *p*-value = .138), and competence in technical knowledge (*F* = 0.30; *p*-value = .742) based on teachers' career phase. However, statistically significant differences were identified in teachers' perceived competence in intra-curricular facilitation (*F* = 3.50; *p*-value = .036) based on career phase. Post-hoc analysis revealed this significant difference was between early career teachers (*M* = 2.96) and late career teachers (*M* = 3.43). The differences in teachers' perceived competence in intra-curricular facilitation were identified as medium, based on effect size calculations (η = .30; Cohen, 1988).

The third objective was to compare teachers' career commitment by career phase (see Table 2). Late career teachers perceived the highest level of career commitment (*M* = 5.33) followed by early career (*M* = 5.04) and mid-career teachers (*M* = 4.83). However, these differences were not statistically significant (*F* = 0.98; *p*-value = .380) based on career phase.

The fourth and final objective of this analysis was to describe the relationship between agriculture teachers' perceived competence and career commitment (see Table 3). We included five predictor variables in our model of teachers' career commitment. These predictor variables included the four measured competence areas: intra-curricular facilitation, pedagogy, program management, and technical knowledge as well as career phase. Career phase was included in the model due to the statistically significant differences found in teachers' intra-curricular facilitation based on career phase. By including career phase in our model, we were accounting for these differences when considering the relationship between competence and commitment (Cohen & Cohen, 1983).

Table 3

Relationship between Perceived Competence and Career Commitment

	Dependent variable: Career Commitment[c]					
Variables	Zero-order correlation (r)	p-value	B	SEB	β	p-value
Intra-Curricular Facilitation[a]	.25	.026	-.23	.34	-.12	.502
Pedagogy[a]	.30	.008	.02	.40	.01	.962
Program Management[a]	.30	.007	.40	.35	.18	.248
Technical Knowledge[a]	.39	<.001	.84	.41	.36	.045
Career Phase[b]	.06	.586	.06	.18	.04	.754

Note. R = .41, R^2 = .17, F = 2.71, p-value = .027
[a]Competence items scaled from 1 "Very Low" to 5 "Very High." [b]Early career teachers include those with zero to five years of experience, mid-career teachers include those with six to 19 years of experience, and late career teachers include those with 20 or more years of experience. [c]Career Commitment items scaled from 1 "Strongly Disagree" to 7 "Strongly Agree."

The five predictor variables, in combination, were found to significantly predict agriculture teachers' career commitment (F = 2.71; p-value = .027). A total of 17% (R^2 = .17) of the variance in agriculture teachers' career commitment could be explained using the combination of predictor variables. Only one of the predictors, technical knowledge, was identified as a significant predictor of agriculture teachers' career commitment (β = .36; p-value = .045) after accounting for the other predictors in the model. Although the remaining predictors were statistically insignificant, it should be noted that three of the four were positive predictors of agriculture teacher's career commitment. Only one predictor, intra-curricular facilitation, was identified as a negative predictor of career commitment (β = -.12; p-value = .502).

Conclusions and Recommendations

The purpose of this research was to explore the relationship between four essential agricultural education competence areas (i.e. intra-curricular facilitation, pedagogical knowledge, program management, and technical knowledge) and agriculture teachers' career commitment. Given the identified shortage of agriculture teachers (Kantrovich, 2010), an exploration of agriculture teachers' career commitment is timely and relevant for the agricultural education profession. In objective one we sought to examine the demographics of the responding teachers.

The results revealed a fairly heterogeneous group of teachers who represented all three career phases. Demographic information was provided to allow readers to compare the sample of teachers in this study to agriculture teacher populations outside our frame.

The second objective examined perceived competence and career commitment by career phase. Those agriculture teachers with the most experience, 20 or more years, ranked higher in all four competence variables. This is what we would hope and expect from seasoned teachers. It was interesting to note that pedagogical competence was the area in which all three career phases were most similar. In fact, late and mid-career teachers had the same score for pedagogical competence. The rate of growth for pedagogical competence is very low across the career phases when compared to the other competence areas. This may indicate teachers establish their pedagogical expertise early in their career or in preservice programs. A practical implication for this finding is that teachers may be reluctant to engage in professional development exercises strictly related to pedagogical development. If they feel competent, they may not have or evidence a felt-need to engage in pedagogical development. While the stability of pedagogy over time is encouraging, the lack of movement may belie a lack of pedagogical growth as teachers mature in their careers. Within agricultural education, one of the most concerted efforts to enhance teacher pedagogical practice was the Delta Conference. The outcomes of the Delta Conferences revealed that teachers engaged in a sustained, intensive pedagogical professional development do perceive sizable growth in their pedagogical competence (Coonrod, McGregor, & Bellah, 2009; McGregor, Bellah, & Coonrod, 2008). Therefore, we recommend teacher educators explore opportunities to encourage the pedagogical growth of teachers throughout their careers through opportunities like Delta.

Analyzing the differences in perceived competence by career phase using ANOVA revealed a statistically significant difference between teachers' perceived competence in intra-curricular facilitation and career phase. Specifically, the difference was between early and late career stage teachers. According to our findings, intra-curricular abilities (e.g. confidence with FFA and SAE related activities) increased throughout the three career stages. This is in contrast to the relative stability of the teachers' pedagogical competence and may be an indication that competence building professional development related to intra-curricular facilitation should be offered to teachers early in their career.

As we mentioned earlier, the issue of teacher retention and cultivation of career commitment is critical to ensure the continuation and growth of agricultural education. Our third objective examined career commitment across three career stages. No significant differences were found between early, mid, and late career teachers. The mean scores for career commitment were highest among early and late career teachers and lowest in mid-career teachers. Young teachers may have youthful exuberance, and perhaps an excitement to be in a new profession, which may support their career commitment. Late career teachers may feel some measure of commitment based on their nearness to retirement. Klassen and Chiu (2010) reference this phenomena specific to work related self-efficacy, a concept closely linked to career commitment (Blackburn & Robinson, 2008; Knobloch & Whittington, 2003; Swan, 2005; Wheeler & Knobloch, 2006), and their research indicated an ebb and flow in self-efficacy over the duration of a career. They identified life, career events, and work challenges as impacting the confidence of individuals to be successful at work (Klassen & Chiu, 2010). It could also be argued that due to differential mortality, only the teachers who are most committed are the ones who make it to the later career stages and the voices of those who exit the profession are not recorded. Perhaps the mid-career point is a pivotal stage at which teachers decide to remain or exit the profession. We recommend teacher educators consider providing professional development opportunities for mid-career teachers. Anecdotally it seems many teacher development programs provide early career teacher workshops and trainings. While this is critical, our findings warrant consideration for interventions to enhance the career commitment of mid-career teachers.

Our final objective was to examine the relationship between perceived competence and career commitment. Agriculture teachers' technical competence, which we defined as knowledge and abilities related to the broad range of agricultural course offerings, was the only significant predictor of career commitment identified in this model. This suggests that as teachers become more competent in the material they are being asked to teach, the more committed they are to the teaching profession. These results re-emphasize the importance of teacher preparation programs that focus on the key technical competence areas teacher candidates need for career success. This connects directly back to our earlier review of teacher competency literature and the theory of self-efficacy. As pre-service teachers engage in mastery experiences (i.e. interact with and teach technical material) and engage in vicarious experiences (i.e. observe others teach and interact with technical material) they increase in their perceptions of competence (Bandura, 1986, 1997). As teacher educators, it is vital that we provide our young teachers with repeated opportunities to develop their technical knowledge.

As we examined the results of our regression, one of the puzzling aspects was the prediction of career commitment in relation to intra-curricular facilitation. While this result was not statistically significant, we did wonder when it emerged as a negative predictor. Prior literature highlights the demands of intra-curricular facilitation. Specifically, beginning teachers exhibiting a high need in providing a well-rounded FFA experience for students (Layfield & Dobbins, 2002) and agricultural teachers having the lowest efficacy in SAE as compared to FFA or classroom instruction (Wolf, 2008). It is clear from both of these studies that agricultural teachers struggle with the complexities of a well-rounded agriculture program. Future studies should examine the manner in which intra-curricular facilitation (i.e. FFA and SAE involvement) influence career commitment. If additional research supports a negative relationship, future studies may consider examining work-family balance as a potential confounding variable.

While this exploratory study provides an initial examination of four presumed predictors of career commitment, further research is needed. We now have empirical evidence that technical competence is a predictor of career commitment and we are able to evaluate, from a practical sense, the relationships between career commitment and pedagogical competence, program management competence, and intra-curricular facilitation. While there is difficulty in examining the complexities of teacher retention, we need to be persistent in researching the many variables that comprise career commitment. The continued existence and success of agricultural education compels our efforts.

References

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215. doi:10.1037/0033-295X.84.2.191

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

Blackburn, J. J., & Robinson, J. S. (2008). Assessing teacher self-efficacy and job satisfaction of early career agriculture teachers in Kentucky. *Journal of Agricultural Education, 49*(3), 1-11. doi: 10.5032/jae.2008.03001

Blau, G. (1985). The measurement and prediction of professional commitment. *Journal of Occupational Psychology, 58*(4), 277-288. doi: 10.1111/j.2044-8325.1985.tb00201.x

Blau, G. (1988). Further exploring the meaning and measurement of professional commitment. *Journal of Vocational Behavior, 32*(3), 284-297. doi: 10.1016/0001-8791(88)90020-6

Blau, G. (1989). Testing the generalizability of a professional commitment measure and its impact on employee turnover. *Journal of Vocational Behavior, 35*(1), 88-103. doi: 10.1016/0001-8791(89)90050-X

Boone, H. N., & Boone, D. A. (2007). Problems faced by high school agricultural education teachers. *Journal of Agricultural Education, 48*(2), 36-45. doi: 10.5032/jae.2007.02036

Borich, G. D. (1980). A needs assessment model for conducting follow-up studies. *Journal of Teacher Education, 31*(3), 39-42. doi:10.1177/002248718003100310

Chapman, D. (1983). A model of the influences on teacher retention. *Journal of Teacher Education*, *34*(5), 43-49. doi: 10.1177/002248718303400512

Clark, R. W., Threeton, M. D., & Ewing, J. C. (2010). The potential of experiential learning models and practices in career and technical education & career and technical teacher education, *Journal of Career and Technical Education 25*(2), 46-62.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* Hillsdale, NJ: Erlbaum.

Cohen, J., & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences.* Hillsdale, NJ: Lawrence Erlbaum Publishers.

Coladarci, T. (1992). Teachers' sense of efficacy and commitment to teaching. The Journal of Experimental Education, 60(4), 323-337. doi: 10.1080/00220973.1992.9943869

Coonrod, V., McGregor, K. W., & Bellah, K. A. (2009). *The effects of Delta Conference participation on agricultural educator lesson design and student learning*. Paper presented at the American Association for Agricultural Education Research Conference, Louisville, KY.

Daily, A. L., Conroy, C. A., & Shelley-Tolbert, C. A. (2001). Using agricultural education as the context to teach life skills. *Journal of Agricultural Education, 42(1)*, 11-20. doi: 10.5032/jae.2001.01011

De Lay, A. M., & Washburn, S. G. (2013). The role of collaboration in secondary agriculture teacher career satisfaction and career retention. *Journal of Agricultural Education, 54*(4), 104-120. doi: 10.5032/jae.2013.04104

Dillman, D. A. (2007). *Mail and internet surveys: The tailored design method* (2nd ed.). Hoboken, NJ: John Wiley & Sons, Inc.

Doerfert, D. L. (Ed.) (2011). *National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015*. Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications.

Duncan, D., & Ricketts, J. C. (2006). Total program efficacy: A comparison of traditionally and alternatively certified agriculture teachers. *Proceedings of the Southern Region American Association for Agricultural Education Conference, Orlando, FL, 409-419.*

Duncan, D. W., Ricketts, J. C., Peake, J. B., & Uesseler, J. (2006). Teacher preparation and in-service needs of Georgia agriculture teachers. *Journal of Agricultural Education*, *47*(2), 24-35. doi: 10.5032/jae.2006.02024

Edwards, M. C., & Briers, G. E. (1999). Assessing the inservice needs of entry-phase agriculture teachers in Texas: A discrepancy model versus direct assessment. *Journal of Agricultural Education*, *40*(4), 40-49. doi: 10.5032/jae.1999.03040

Firestone, W. A., & Pennell, J. R. (1993). Teacher commitment, working conditions, and differential incentive policies. *Review of Educational Research*, *63*(4), 489-525.

Garton, B. L., & Chung, N. (1996). The inservice needs of beginning teachers of agriculture as perceived by beginning teachers, teacher educators, and state supervisors. *Journal of Agricultural Education*, *37*(3), 52-58. doi: 10.5032/jae.1996.03052

Goulet, L. R., & Singh, P. (2002). Professional commitment: A reexamination and an extension. *Journal of Vocational Behavior, 61*(1), 73-91. doi: 10.1006/jvbe.2001.1844

Grissmer, D., & Kirby, S. (1987). *Teacher attrition: The uphill climb to staff the nation's schools.* Santa Monica, CA: RAND.

Hartfield, K. N. (2011). *Perceived levels of teacher self-efficacy among secondary Arizona agricultural education teachers.* (Unpublished master's thesis). University of Arizona, Tucson.

Hausman, C. S., & Goldring, E. B. (2001). Sustaining teacher commitment: The role of professional communities. *Peabody Journal of Education, 76*(2), 30-51.

Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal, 38*(3), 499-534. doi: 10.3102/00028312038003499

Ingersoll, R. M., & Smith, T. M. (2003). The wrong solution to the teacher shortage. *Educational leadership*, *60*(8), 30-33.

Ingersoll, R. M., & May, M. (2010). The magnitude, destinations, and determinants of mathematics and science teacher turnover. *Educational Evaluation and Policy Analysis*, *34*(4), 435-464.

Joerger, R. M. (2002). A comparison of the inservice education needs of two cohorts of beginning Minnesota agricultural education teachers. Journal of Agricultural Education, 43(3), 11-24. doi: 10.5032/jae.2002.03011

Kantrovich, A. J. (2010). *A national study of the supply and demand for teachers of agricultural education from 2006-2009*. American Association for Agricultural Education. Retrieved from http://www.naae.org/links/resources/docs/2010-supply-Demand-study-report.pdf

Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of Educational Psychology, 102*(3), 741-756. doi: 10.1037/a0019237

Knobloch, N. A., & Whittington, M. S. (2003a). Differences in teacher efficacy related to career commitment of novice agriculture teachers. *Journal of Career and Technical Education, 20*(1), 1-11.

Layfield, D. K., & Dobbins, T. R. (2002). Inservice needs and perceived competencies of South Carolina agricultural educators. Journal of Agricultural Education, 43(4), 46-55. doi: 10.5032/jae.2002.04046

Lindner, J. R., Murphy, T. H., & Briers, G. E. (2001). Handling nonresponse in social science research. *Journal of Agricultural Education, 42*(4), 43-53. doi: 10.5032/jae.2001.04043

McGregor, K. W., Bellah, K. A., & Coonrod, V. (2008). *The Delta Conference – Participant perceptions of learned instructional strategies and techniques*. Paper presented at the Western Region American Association for Agricultural Education Research Conference, Park City, UT.

Medley, D. M., & Shannon, D. M. (1994). Teacher evaluation. In T. Husen, & T. N. Postletwaite (Eds.), *The International Encyclopedia of Education*, *Vol. 10*, 2nd ed., pp. 6012-6020. New York, NY: Pergamon.

Mee, M., & Haverback H. R. (2014). Commitment, preparation, and early career frustrations: Examining future attrition of middle school teachers. *American Secondary Education, 42*(3), 39-51.

Miller, L. E., & Smith, K. L. (1983). Handling non-response issues. *Journal of Extension, 21*(5), 45-50.

Mulder, M. T., Weigel, T., & Collins, K. (2006). The concept of competence in the development of vocational education and training in selected EU member states: A critical analysis. *Journal of Vocational Education and Training, 59*(1), 65-85.

Mundt, J. P., & Connors, J. J. (1999). Problems and challenges associated with the first years of teaching agriculture: A framework for preservice and inservice education. *Journal of Agricultural Education*, *40*(1), 38-48. doi: 10.5032/jae.1999.01038

Myers, B. E., Dyer, J. E., & Washburn, S. E. (2005). Problems facing beginning agriculture teachers. *Journal of Agricultural Education, 46*(3), 47-55. doi: 10.5032/jae.2005.03047

Osborne, E. (1992). A profession that eats its young. *Agricultural Education Magazine, 64*(12), 3-4.

Phipps, L. J., Osborne, E. W., Dyer, J. E., & Ball, A. (2007). *Handbook on agricultural education in public schools* (6th ed.). Clifton Park, NY: Thomson Delmar Learning.

Raju, P., & Srivastava, R. (1994). Factors contributing to commitment to the teaching profession. *International Journal of Educational Management, 8*(5), 7-13. doi: 10.1108/09513549410065684

Robinson, S. J. & Edwards, C. M. (2012). Assessing the teacher self-efficacy of agriculture instructors and their early career employment status: A comparison of certification types. Journal of Agricultural Education, 53(1), 150-161. Doi: 10.5032/jae.2012.01150

Rocca, S. J., & Washburn, S. G. (2006). Comparison of teacher efficacy among traditionally and alternatively certified agriculture teachers. *Journal of Agricultural Education, 47*(3), 58-69. doi: 10.5032/jae.2006.03058

Roelofs, E., & Sanders, P. (2007). Towards a framework for assessing teacher competence. *European Journal of Vocational Training, 40*, 123-139.

Shen, J. (1998). Teacher retention and attrition in public schools: Evidence from SASS91. *Journal of Education Research, 98*(2), 81-95. doi: 10.1080/00220679709597525

Singh, K., & Billingsley, B. (1996). Intent to stay in teaching of students with emotional disorders vs other special educators. *Remedial & Special Education, 17*(1), 37-47. doi: 10.1177/074193259601700105

Sorensen, T. J., Tarpley, R., & Warnick, B. K. (2010). Inservice needs of Utah agriculture teachers. *Journal of Agricultural Education, 51*(3), 1-11. doi: 10. 5032/jae.2010.03001

Sorensen, T. J., Lambert, M. D., & McKim, A. J. (2014). Examining Oregon agriculture teachers' professional development needs by career phase. *Journal of Agricultural Education, 55*(5), 140-154. doi: 10.5032/jae.2014.05140

Swan, B. G. (2005). *The relationship between the 2004 Ohio State University Agricultural Education student teachers' learning style, teacher heart, and teacher sense of efficacy.* (Unpublished doctoral dissertation). The Ohio State University, Columbus.

Torres, R. M., Ulmer, J. D. & Aschenbrener, M. S. (2008). Workload distribution among agriculture teachers. Journal of Agricultural Education, 49(2), 75-87. doi: 10.5032/jae.2008.02075

Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*, 783-805. doi: 10.1016/S0742-051X(01)00036-1

Warnick, B. K., Thompson, G. W., & Tarpley, R. S. (2010). Characteristics of beginning agriculture teachers and their commitment to teaching. *Journal of Agricultural Education*, *51*(2), 59-69. doi: 10.5032/jae.2010.02059

Wheeler, J., & Knobloch, N. A. (2006). Relationship of teacher and program variables to beginning agriculture teachers' sense of efficacy. *Proceedings of the National Agricultural Education Research Conference, Charlotte, NC, 33, 590-600.*

Woolfolk Hoy, A. E. (2000). Changes in teacher efficacy during the early years of teaching. *Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.*

Wolf, K. J. (2008). *Agricultural education teacher self-efficacy: A descriptive study of beginning agricultural education teachers in Ohio.* (Unpublished doctoral dissertation). The Ohio State University, Columbus.

Wolf, K . J. (2011). Agricultural education perceived teacher self-efficacy: A descriptive study of beginning agricultural education teachers. *Journal of Agricultural Education, 52*(2), 163-176. doi: 10.5032/jae.2011.02163

Stakeholders' Perspectives of the Essential Skills for Beginning Agricultural Science Teachers: A Delphi Approach

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Abstract

The numerous roles and responsibilities of the agricultural science teachers can often compete with agriscience teachers' abilities to provide effective classroom instruction. The purpose of this study was to identify the essential skills related to Texas beginning agricultural science teachers' roles as classroom teachers. A Delphi technique consisting of three consecutive survey rounds was utilized. Members of the Vocational Agriculture Teachers Association of Texas (VATAT) Board of Directors served as the study's panel of experts. Results from this study revealed 106 essential classroom skills, which were grouped into 11 skill categories. After comparing these results to other agricultural education studies, it is evident that these 106 identified skills are directly linked to the overall success and effectiveness of beginning teachers across the nation.

Introduction

Agricultural education has undergone extreme transformations since it entered the secondary public classroom over one hundred years ago (Phipps, Osborne, Dyer, & Ball, 2008). According to Understanding Agriculture: New Directions for Education (National Research Council, 1988), a new program emphasis in agricultural education has resulted in heavily revised curricula, new science-based agriculture courses and program specializations, and dramatically different approaches to teaching agriculture in the public school systems (National Research Council, 1988).

Since the completion of the National Research Council's report in 1988, agricultural education has been reinvented as a science-based area of study nationwide (Phipps et al., 2008). Agriscience teachers no longer exclusively provide vocational skills to rural farming students or students wanting to enter directly into the agricultural workforce. Today, these educators are responsible for preparing students for higher educational opportunities in science, business, and governmental professions. Due to technology advancement and emerging social trends, it is vital for agricultural educators to provide educational experiences for the students of today and the agriculturalist of tomorrow (Talbert, Vaughn, & Croom, 2005).

A majority of career and technical agricultural programs build their program around the three overlapping circles model, which includes classroom and laboratory instruction, experiences as they relate to supervised agricultural experience (SAE) programs, and student leadership development through participation in the FFA student organization (Talbert et al., 2005). The roles and responsibilities of an agricultural educator expand far beyond these three fundamental components (Phipps et al., 2008). Agricultural science teachers face requirements that are unique to the nature of agricultural education programs, which are not experienced by teachers in any other subject area (Talbert, Camp, & Heath-Camp, 1994).

Agricultural science teachers need a distinctive set of competencies (Burris & Keller, 2008), which researchers have grouped into a variety of categories. Shippy (1981) recognized 10 competency categories signifying 246 teaching competencies. These competency categories include 1) program planning, development, and evaluation; 2) planning of instruction; 3) execution of instruction; 4) evaluation of instruction; 5) student vocational organizations; 6) supervised occupational experiences; 7) management; 8) guidance; 9) school-community relations; and 10) professional role and development (Shippy, 1981).

Roberts and Dyer (2004) recognized 40 characteristics of an effective agricultural science teacher. The researchers categorized these characteristics into eight competency areas consisting of instruction, FFA, SAE, community relations, marketing, professionalism and professional growth, program planning and management, and personal qualities. Phipps et al., (2008) used variations of these competency domains to describe the preparations of secondary agricultural teachers. Their alternatives include program planning and evaluation, curriculum and course development, instructional design, teaching methods, teaching and learning processes, learning assessment, laboratory and facility design and use, instructional technology, adult and youth development, and experiential learning.

Industry procedures, educational styles and priorities, and student individualities have also changed over time. Due to these continuous changes, the relative proportion of instructional time committed to each of these roles and responsibilities has also continued to fluctuate. Current teacher responsibilities require large amounts of dedication in order to plan, supervise, and evaluate (Phipps et al., 2008). However, agriscience teachers' widespread dedication to their profession's numerous responsibilities may generate occupational challenges, especially for new teachers.

Miller and Shield (1984) reported balancing SAE projects and activities, classroom teaching, FFA advising, and program administration as the major challenges of the agricultural science teaching profession. Walker, Garton, and Kitchel (2004) identified 26 teacher related responsibilities, which have contributed to individual's decision to leave the profession. King, Rucker, and Duncan (2013) concluded classroom instruction and FFA/SAE responsibilities to be major causes of stress for agricultural educators. However, there is one responsibility of the agriscience teacher, which should not be considered a challenge, and this is the responsibility of teaching. This responsibility is the primary duty of an agricultural science teacher (Newcomb, McCracken, Warmbrod, & Whittington, 2004).

Effective teachers are the most important factor when it comes to the success of a student (Mishel, Allegretto, & Corcoran, 2008). Over the past six decades, numerous studies have been conducted on the burnout and attrition of agricultural science teachers (Croom, 2003; Crutchfield, Ritz, & Burris, 2013; Heath-Camp & Camp, 1990; Kelsey, 2006; Myers, Dyer, & Washburn, 2005). Throughout the years, there has been an excess amount of open agricultural science teacher positions with a lack of qualified teachers to fulfill them (Camp, Broyles, &

Skelton, 2002). Teacher attrition or lack of teacher retention is the single largest factor in the United States for determining the demand for additional teachers (Croasmun, Hampton, & Herrman, 1999). Chan (1998) identified teacher burnout as a major contributor to job related stress. If agricultural education is going to continue to expand and flourish, it will need an adequate supply of qualified teachers (Boone & Boone, 2009).

Being a secondary agricultural educator is both challenging and demanding, because one is accountable for activities and roles that extend far beyond classroom and laboratory instruction (Newcomb et al., 2004). Due to the extensive roles and responsibilities found within the position of an agricultural science teacher, classroom education can compete with the widespread range of tasks associated with secondary agricultural programs. Examples of these tasks include SAE and FFA activities and responsibilities.

The multiple roles assumed by educators impact both their professional and personal lives (Flores & Day, 2006). Knowing this, agriscience teachers, particularly new agriscience teachers, could be facing the challenge of facilitating students' learning while also focusing on their dedication to activities connected outside of the classroom setting. Competences in both teaching methods and in the technical subject matter are essential to be effective as a secondary agricultural educator (Newcomb et al., 2004).

A number studies have been conducted regarding the competencies and characteristics needed by agriscience teachers (Burris & Keller, 2008; Phipps et al., 2008; Roberts & Dyer, 2004; Shippy, 1981). However, there has been a lack of research regarding the essential skills needed by agriscience teacher program graduates in order to be effective classroom teachers. Keeping the primary role of a teacher in mind, which is to teach, this study sought to identify the essential skills related to Texas beginning agricultural science teachers' roles as classroom teachers.

This study addressed Priority Five, Efficient and Effective Agricultural Education Programs, of the National Research Agenda for the American Association for Agricultural Education (Doerfert, 2011).

Theoretical Framework

The theoretical framework for this study was based on the attribution theory. The attribution theory attempts to analyze how individuals interpret events, and how those interpretations relate to their thinking and levels of performance (Wiener, 1974). Heider (1958) labeled this line of research as naïve or commonsense psychology. Heider (1958) understood people as inexperienced scientists, who go through daily activities trying to comprehend other's behavior. He perceived people as examiners of other person's behavior. Individuals will collect information, and then analyze the information until they have arrived at reasonable cause or explanation for that person's actions (Heider, 1958). According to Heider (1958), a person's actions depend on two attributions: 1) internal factors, a person's behavior as it relates to another person's attitude, character, and/or personality, and 2) external factors, a person's behavior as a result of a certain and/or specific situation.

Heider's (1958) research directed Weiner's (1974) deeper understanding and exploration of the attribution theory. Weiner (1974) identified the causal dimensions of internal and external attribution to be broken into three different categories: 1) locus of control, 2) stability, and 3) controllability. Weiner (1985) would go on to identify four primary attribution factors, which influence the causal dimensions of internal and external attribution. These factors include ability, effort, task differentiation, and chance/luck.

The attribution theory has developed over the years to address questions relating to social perception and self-perception (Kelley, 1973). According to Kelley (1973), the attribution theory relates closely to the covariation principle, which deals with the possible cause and effect of events over a certain period of time. The attribution theory assisted the research as this study progressed, because it provided comparison factors for how agricultural science teachers may act and/or respond to certain roles and responsibilities within the classroom setting.

Purpose of the Study

The purpose of this study was to identify the essential skills related to Texas beginning agricultural science teachers' roles as classroom teachers. The following research objective was generated to focus and guide the direction of the study:

1. Identify the essential skills related to Texas beginning agricultural science teachers' roles as classroom teachers.

Methodology

The Delphi technique can be used for a variety of reasons within numerous professional occupations (Akers, 2000). However, Chizari (1990) declared that most Delphi studies contain certain key elements, which are considered customary by a number of Delphi researchers (Buriak & Shinn, 1993; Anderson & Jones, 1986; Ulschack, 1983; Sutphin, 1981; Dalkey, 1968). These customary elements of the Delphi process include: use of a panel of experts, anonymity of panel members from other panel members; repetition and controlled feedback of individual responses, and group responses in describing panel judgments.

The primary qualification used to define an expert in this study was Texas agricultural educators who serve as a member on the VATAT Board of Directors. The VATAT is a professional organization for agriculture science teachers and supporters of agriculture education. It is governed by a board of directors, which is composed of its active membership. Each of the ten Texas FFA Area Associations is entitled to elect one VATAT board director per 28 active members, with a minimum of one director per area association (VATAT, 2014).

Nine demographic questions were asked during this study in order to describe the personal characteristics and program demographics of the panel of experts. Program demographics of panel members includes years of teaching experience, years of teaching under current employer, number of agriscience teachers within the program, and current enrollment of FFA members. Panelists ranged in years of teaching experienced from zero to 36 years. Many of the panelists fell into the 16 to 20 year bracket (n = 7, 26.8%) of teaching experience. The number of years panelists spent under their current employer ranged from zero to 35 + Plus. Again, a good number of the panelists fell into the 16 to 20 year bracket (n = 8, 32.0%).

On behalf of the researchers, the President of the VATAT Board of Directors was asked to distribute the first survey round by email to each of the 58 VATAT Board Members. Twenty-six of the initial 58 VATAT Board members chose to participate in the first survey round. All respondents to Round One were considered as the expert panel. The expert panel was asked to complete three consecutive survey rounds. These individuals were selected to serve as this study's panel of expert because they were a representation of experienced Texas agricultural educators from across the state. A limitation of this study is while all 26 participants are members of the directing board of the association, the data does not represent the entire board and findings should be limited to participating leaders in the organization.

Researchers followed Chizari's (1990) customary elements of the Delphi process to design and develop the Round One instrument. The purpose of the Round One instrument was to develop a question, which would elicit responses from a panel of experts regarding the essential skills related to the roles of the classroom teacher. Emphasis was placed on the skills agricultural education program graduates need to become effective classroom teachers. As recommended by Martino (1972) and Moore (1987), this instrument consisted of one open-ended question and nine demographic questions. Demographic questions were only asked in the first survey round. The following open-ended question was included in the initial survey instrument:

1. **What are the essential skills related to the roles of classroom teachers needed by program graduates today?**

A panel of faculty members from the Department of Agricultural Education and Communications at Texas Tech University validated the open-ended question used within the Round One instrument. This question was validated for content and suitability to the purpose of the study.

The President of the VATAT Board of Directors distributed the first survey round by email to each of the 58 VATAT Board Members. The email included the purpose of the study, survey instructions, and the Round One Qualtrics' survey link. This email also informed participants about the Delphi process, and that they would be asked to complete two additional survey rounds. The initial email ensured all participants that their responses would remain strictly confidential and no identifying information would be released. Participants were asked to have the first survey round completed by specified date.

Dillman's (2009), Delbecq, Ven, and Gustafson (1975), and Chizari (1990) all emphasized the importance of providing follow-ups when using the Delphi technique. Following their suggestions, researchers sent email reminders to all non- responding VATAT Board Members. A second email reminder was distributed to the remaining non-respondents two weeks later. Each email reminder stressed the importance of the experts' opinion, reminded them of their significance within this specially selected panel, and provided them with a courtesy link to the Round One Qualtrics' survey. This followed Dillman's (2009) recommended procedures of sending out the initial instrument to all non-respondents after three weeks of no response. All respondents from the first survey round were sent a thank you email for their time and participation. The respondents to Round One included 26 of the 58 VATAT Board Members.

The responses for Round One were condensed, summarized, and reviewed to develop 118 scale level items for the second survey round of this study. Similar responses were collapsed and rewritten to convey the intention of various responses. In the Round Two instrument, panel members were asked to indicate their level of agreement as to whether each of the skills listed within the survey were essential to the roles of the classroom agriscience teacher. A four-point Likert scale, which ranged from "Strongly Disagree", "Disagree", "Agree", and "Strongly Agree" was used to rate each of the 118 skills. According to Garland (1991), a scale without a neutral point is preferred since typical marker researchers want respondents to make a definite choice rather than choosing a neutral position on a scale. Since mid-range responses can lead to false consensus, it is extremely important to use an even numbered scale when performing a Delphi study (Cox, 1996).

Following the research of previous Delphi studies, *consensus of agreement* was determined *a priori* (Akers, Vaughn, & Haywood, 2003; Buriak & Shinn, 1993; Connor & Roberts, 2013; Dyer, Breja, & Ball, 2003; Rayfield & Croom, 2010; Smalley & Retallick, 2011). The researchers determined *a priori* that only skills that received a mean of 3.25 or higher would be used for inclusion in the essential skills related to the roles of classroom teacher. The high *consensus of agreement* was chosen with the expectation of eliminating unneeded skills from the study. A section was also added to the end of the survey, which asked panelist to list additional skills overlooked in Round One.

The panel of 26 experts was sent an email, which included a link to the second survey instrument. Following Dillman's (2009) recommendations, all panelists, both respondents and non-respondents, received a follow-up email. According to Dillman (2009), this type reminder should serve as both a thank you to the respondents and a courteous reminder for the non-respondents. One individual from the original 26 respondents asked to be removed from the expert panel. Nineteen of the 25 expert panelists chose to respond to the second survey round for a total response rate of 76%.

Round Three served as the final round of this study. Delbecq et al. (1975) indicated that the final Delphi round provides closure for the panelist by allowing them to vote on items established in Round One and clarified in Round Two. Responses from the second survey round were independently analyzed using the mean. Eleven of the 118 skills failed to reach a mean of 3.25 *consensus of agreement*, which led to their elimination from the study. The panelist recommended no additional skills from Round Two. The analyzed data from Round Two was used to create Round Three.

During this final survey round, participants were asked to choose (yes or no) on whether each of the remaining 107 teacher related skills should remain as part of the essential skills related to the roles of the classroom teacher. The remaining 25 expert panelists were sent an email, which included a link to the third and final survey instrument. In this email panelist were thanked for their participation and advised to contact the researchers if they were interested in the results of the study. To avoid panelist frustration and annoyance, no follow-up emails were sent out.

Seventeen of the 25 expert panelists chose to respond to the third survey round for a total response rate of 68%. Responses from the third survey round were analyzed using frequencies and percentages. One of the 107 skills failed to reach to 81% level of agreement, which led to its elimination from the study. Two independent researchers analyzed the data from Round One by condensing, collapsing, and summarizing alike and similar responses. Demographic data was exported from Qualtrics into the Statistical Package for Social Science (SPSS) program. In SPSS the demographic variables were analyzed using frequency, mean, median, and standard deviation.

Data from Rounds Two and Three were also exported from Qualtrics into the SPSS program. In SPSS numerical values were assigned to each variable within the two instruments. Descriptive statistics such as frequency and percentage were used to analyze the data from Rounds Two and Three. Researchers determined a priori that only skills that received an 81% level of agreement or higher were used for inclusion in the essential skills related to the roles of the classroom teacher. The high percentage level of agreement was chosen with the expectations of eliminating unneeded skills from the study.

Findings

Round One

The primary objective of this study was to identify the essential skills related to Texas agricultural science teachers' roles as classroom teachers. The first question within the Round One instrument addressed this objective. This open-ended question regarding the essential skills related to the roles of classroom teachers needed by program graduates today produced 176 responses from the panel. Analysis of these responses generated 118 skills, which were broken into 11 skill categories. These 11 skill categories consist of the following:

1. **Teacher Preparation**
2. **Curriculum Knowledge**
3. **Professional Organizations**
4. **FFA**
5. **SAE**
6. **Technology**
7. **Organization and Time Management**
8. **Communication**
9. **Personality Characteristics**
10. **Work Ethic**
11. **Professionalism**

Round Two

In the Round Two instrument, panel members were asked to indicate their level of agreement as to whether each of the skills listed within the survey were essential to the roles of the classroom agriscience teacher. During this round, one individual from the original 26 Round One respondent asked to be removed from the expert panel. Respondents to the second round included 19 of the 25 expert panelists.

A four-point Likert scale with the rankings of “Strongly Disagree”, “Disagree”, “Agree”, and “Strongly Agree” was used to rate each of the 118 skills. This scale was used to determine each panel member’s consensus of agreement regarding the each of the classroom skills identified in Round One. The mean of the number of panelist who agreed or strongly agreed with each skill was used to measure the overall consensus of agreement. The researchers determined a priori that only skills that received a mean of 3.25 or higher would be used for inclusion.

Panelists exhibited an extremely high consensus of agreement for a majority of the skills presented in Round Two. One hundred percent of the panel agreed or strongly agreed on 107 of the 118 classroom related skills. Eight-two of these skills fell within the real-limits of the “Strongly Agree” ranking on this scale. Eleven of the 118 skills fell below the mean of 3.25 and were eliminated. The lowest rated skill was “Knowledge of the Alumni Association” with a mean of 2.74.

Round Three

During this third and final survey round, participants were asked to choose (yes or no) on whether each of the remaining 107 teacher related skills should remain as part of the essential skills related to the roles of the classroom teacher. Seventeen of the 25 expert panelists chose to respond to the third survey round.

The percentage of the panel that agreed (answered “yes’) with each skill was used to measure the overall level of agreement. The researchers determined *a priori* that only skills that received an 81% level of agreement or higher would be used for inclusion.
Sixty-three of the 107 skills met the 100% level of agreement. These 63 skills were divided into 10 of the 11 classroom skill categories. None of these skills fit into the SAE category. In Table 1, ten of the 63 skills that met 100% level of agreement are shown.

Table 1

Round Three Competency Agreement Levels (N= 17)

Competency	Competency Category
1. Ability to access students’ knowledge	Teacher Preparation
2. Ability to adapt to student needs	Teacher Preparation
3. Ability to allow student applications of teaching concepts	Teacher Preparation
4. Ability to be on time	Professionalism
5. Ability to communicate clearly	Communication
6. Ability to communicate verbally	Communication
7. Ability to communicate with administrates	Communication
8. Ability to communicate with parents	Communication
9. Ability to connect learning to real world applications	Teacher Preparation
10. Ability to facilitate class discussion	Teacher Preparation

Four skills received a 94% level of agreement. These skills were divided into the teacher preparation, curriculum knowledge, SAE, and professional organizations skill categories. Eighteen skills received 93.8% level of agreement. These skills were listed beneath eight of the 11 classroom skill categories. Those categories were teacher preparation, work ethic, organization and time management, communication, SAE, FFA, professionalism, and personality characteristics. Ten skills received 93.3% level of agreement. These skills fit under the communication, teacher preparation, SAE, personality characteristics, curriculum knowledge, organization and time management, and professional skill categories. One skill received 92.9% level of agreement and fell under the personal characteristics skills categories. In Table 2, ten of the 33 skills that met between 93% to 94% level of agreement are shown.

One skill received 88.2% level of agreement. Three skills received 87.5% level of agreement. Six skills received 86.7% level of agreement. Each of these skills were divided up into one of the following skill categories: SAE, teacher preparation, technology, organization and time management, FFA, personality characteristics, and curriculum knowledge. One of the 107 skills failed to reach to 81% level of agreement, which led to its elimination from the study. This skill was "Having a sense of humor" (80.0%). In Table 3, the ten skills that met between 86% to 88% level of agreement are shown.

Table 2

Round Three Competency Agreement Levels (N= 17)

Competency	Competency Category	% of Agreement[a]
1. Ability to work with students who are on different leveling levels	Teacher Preparation	94.1
2. Knowledge of Ag. Mechanics	Curriculum Knowledge	94.1
3. Knowledge of the AET Record Book System	SAE	94.1
4. Knowledge of the VATAT	Professional Organizations	94.1
5. Ability to be creative and diverse in teaching	Teacher Preparation	93.8
6. Ability to be diverse in instructional strategies	Teacher Preparation	93.8
7. Ability to be flexible	Work Ethic	
8. Ability to be organized	Organization and Time Management	93.8
9. Ability to communicate with faculty	Communication	93.8
10. Ability to communicate with students	Communication	93.8

Note. [a] The percentage of individuals who answered "yes"

Table 3

Round Three Competency Agreement Levels (N= 17)

Competency	Competency Category	% of Agreement[a]
1. Ability to teach students about the AET Record Book System	SAE	88.2
2. Ability to plan lessons which last bell to bell	Teacher Preparation	87.5
3. Ability to recognize inaccurate information	Technology	87.5
4. Knowledge of important dates for local and state activities	Organization and Time Management	87.5
5. Ability to train CDE teams	FFA	86.7
6. Ability to train LDE teams	FFA	86.7
7. Being initiative	Personality Characteristics	86.7
8. Being innovated	Personality Characteristics	86.7
9. Being proactive	Personality Characteristics	86.7
10. Knowledge of Ag. Mechanic management skills	Curriculum Knowledge	86.7

Note. [a] The percentage of individuals who answered "yes"

Conclusions and Implications

The VATAT board members who served on this study's expert panel came to the consensus that there are 106 essential classroom skills needed by today's agricultural education program graduates. According to the panelists' consensus these 106 skills were grouped into 11 classroom teacher skill categories. All agriscience teachers need to possess these skills or skills in order to be successful classroom teachers. The panelists would like to see future agriscience teachers with classroom skills in the following areas: teacher preparation, curriculum knowledge, professional organizations, FFA, SAE, technology, organization and time management, communications, personality characteristics, work ethic, and professionalism.

Research has shown that these 11 classroom skill categories are not only associated with the essential skills of classroom agriscience teachers, but they are also linked to the following: characteristics of effective teachers (Foster & Finley, 1995; Larsen, 1992; Lockaby & Vaughn, 1999; Luft & Thompson, 1995; Miller et al, 1989; Newcomb et al., 2004; Richardson & Arundell, 1989; Roberts & Dyer, 2004; Rosenshine & Furst, 1971; Suydam, 1983; Young, 1990); preparations of secondary school teachers (Phipps et al., 2008); responsibilities of the agriscience teacher (Local Program of Success, 2014); needs of beginning agriscience teachers (Shippy, 1981); challenges faced by introduction teachers (Brock and Grady, 1998; Burris & Keller, 2008; Mundt & Connors, 1999; Myers et al., 2005); and the in-service needs of beginning teachers (Duncan, Ricketts, Peake, & Uessler, 2006; Garton & Chung, 1996; Layfield & Dobbins, 2002). Each of these previous studies recognized some, if not all, of the 11 classroom skill categories as essential areas of needed focus within the agricultural education profession. A majority of the essential classroom skills found within these 11 skill categories were also addressed within these various studies.

After comparing the findings from this study to those of other agricultural education studies, it is evident that these 106 identified skills are associated with more than the essential roles of Texas agriscience classroom teachers. They are also directly linked to the overall success and effectiveness of beginning agriscience teachers across the nation. Knowing this, researchers can conclude that these skills not only represent essential classroom skills, but the challenges faced by a majority of introductory agriscience teachers.

Research has found that the variability in the agriscience teacher job description (Duncan et al., 2002; Garton & Chung, 1996; Shippy, 1981) can cause apprehension for many new agriscience teachers (Lambert, Henry, & Tummons, 2011). According to Day (2008), early induction teachers (teachers with 0-3 years of experience) struggle with the challenges of becoming effective teachers while also facing the high commitment and demands of the profession. In this phase, beginning teachers struggle with maintaining job security, meeting the demands of the profession, and balancing heavy workloads, long work hours, and increased amounts of stress (Moir, 2005).

Under these challenging circumstances, beginning teachers are particularly vulnerable to job related stress, time management issues, and work overload (Mundt & Connors, 1999; Ritz, Burris, Brashears, & Fraze, 2013; Talbert, Camp, & Heath-Camp, 1994; Torres et al., 2008; Torres, Lawver, & Lambert, 2009). In order to address the needs and challenges of beginning teachers, Garton and Chung (1996) recommended the development of in-service courses specifically for introductory teachers. However, if these challenges are not addressed, lack of job commitment, motivation, and effectiveness can all lead to an agriscience teacher's decision to vacate the profession (Day, 2008).

Teacher burnout is often contributed to job related stress (Chan, 1998). King, Rucker, and Duncan (2013) found that agriscience teachers consider the following FFA and SAE responsibilities as highly stressful: planning an FFA banquet, preparing CDE teams, organizing fundraisers, and preparing degrees applications. Supervising SAE projects, attending livestock shows and FFA week were considered mid-level stressors of the teacher's FFA and SAE responsibilities. These same high stress responsibilities were addressed in the 106 classroom teacher related skills identified within this study.

King et al. (2013) also reported the following classroom instruction duties as high stress responsibilities: paperwork and reports, creating new curriculum, lack of teaching materials, managing student behaviors, and teaching new content. Organizing laboratory activities, being inexperienced with the course content, preparing for class, and completing standard requirements were considered mid-level stressors of the teacher's classroom duties (King et al., 2013). These high stress responsibilities were also identified as classroom teacher related skills by the expert panel.

Teacher stress occurs when interactions between others or work responsibilities become emotionally, physically, and mentally taxing (Lazarus & Folkman, 1984). This high stress, accompanied with the multiple roles and responsibilities assumed by agriscience educators impacts both their professional and personal lives (Flores & Day, 2006). If introductory teachers want to establish effective agricultural programs as well as maintain a stable home life, they have to be able to balance their priorities and responsibilities carefully (Niehaus, 2008). Findings within the study support the conclusion from Flores and Day (2006), Lazarus and Folkman (1984), and Niehaus (2008).

According to the findings of this research, 63 of the 107 classroom skills met the 100% level of agreement. However, these 63 skills were only divided into 10 of the 11 skill categories: teacher preparation, curriculum knowledge, professional development, FFA, technology, organization and time management, communication, personality characteristics, work ethic, and professionalism. None of these skills fit into the SAE category. In conclusion, beginning agricultural educators need to focus their attention on the skills addressed within these 10 classroom skill categories.

Recommendations for the Profession

Highly qualified and effective teachers are desperately needed in today's public school systems (Feistritzer & Haar, 2008). If agricultural education is going to continue to expand and flourish, it will need an adequate supply of qualified classroom teachers (Boone & Boone, 2009). According to Miller et al. (1989), preparing effective and competent agriscience teachers primarily resides within the agricultural education programs at the university level. However, understanding the skills needed by classroom agriscience teachers could assist both university educators and professional organizations in developing our beginning teachers.

According to the results of this study, if agricultural education programs want to produce effective classroom teachers, the skills and characteristics identified in this study need to exist prior to students' program graduation or be developed afterwards. One recommendation could be developing coursework or experiences on the university level, which focus on development of these skills within pre-service teachers. However, this recommendation may not be a realistic option for most agricultural education programs. Given that agricultural educations programs already standardize their curriculum, it would be difficult for them to accommodate 106 new skills into their current courses. Instead, they should continuously reevaluate their current courses and curriculum in order to thoroughly understand the needs and challenges of their program graduates.

Another recommendation is providing in-service training to program graduates and early introductory teachers. Garton and Chung (1996) recommended the enhancement of instruction, program development, and program administration to also be addressed. Advice on preventing teacher burnout, work-life balance, time and stress management, and occupational motivation could also be topics of choice as well. Part of the attribution theory is having individuals identify the attributing cause of their challenges and/or problems. According to Harvey and Martinko (2010), if individuals will identify the accrediting cause of their problems, this will aid them in preventing behaviors and other factors related to their particular outcomes.

Recommendations for Research

In 1981, Shippy recommended the periodical evaluation of skill needs. As such, additional research should be conducted to determine the appropriate classroom skills required from agriscience teachers and agricultural education program graduates. Additional sources should be included to determine skill needs. These sources could include evaluations from groups of agriscience teachers within each of the six levels of Day's (2008) professional life phases: Early Induction Teachers (0-3 years), Induction Teachers (4-7 years), Early Teachers (8-15 years), Mid Teachers (16-23 years), Late Teachers (24-30 years), and Sunset Teachers (31+ years).

Burris and Keller (2008) concluded that inexperienced teachers, such as program graduates, are not necessarily in a position to recognize areas of great concern or need. However, further investigation of agricultural education program seniors' expectations of the profession prior to and after student teaching could explore how students perceive the agriscience teaching profession.

References

Akers, C., Vaughn, P., & Haywood, J. (2003). High School Agricultural Communications Competencies: A National Delphi Study. *Journal of Agricultural Education, 44*(4), 1-10.

Anderson, T. & Jones, N. (1986). *TAFE curriculum research: A review of group process methods.* Adelaide: TAFE National Centre for Research and Development.

Boone, H. & Boone, D. (2009). An assessment of problem faced by high school agricultural education teachers. *Journal of Agricultural Education, 50*(1), 21-32.

Brock, B. L., & Grady, M. L. (1998). Beginning teacher induction: The role of the principal. *The Clearing House, 71*(3), 179-183.

Buriak, P., & Shinn, G.C. (1993). Structuring research for agricultural education: A national Delphi involving internal experts. Journal of Agricultural Education, 34(2), 31-36.

Burris, S., & Keller, J. (2008). Professional Roles and Responsibilities: Challenges for Induction Teachers. *Journal of Agricultural Education. 49*(2) 118-129.

Camp, W. G., Broyles, T., & Skelton, N. S. (2002). *A national study of the supply and demand for teachers of agricultural education in 1999-2001*. Blacksburg, VA: Virginia Polytechnic Institute and State University.

Chan, D. W. (1998). Stress, coping strategies, and psychological distress among secondary school teachers in Hong Kong. *American Educational Research Journal, 35*(1), 145-163.

Chizari, M. (1990). *An examination of adult education in agriculture in the southern region of the United States by the use of the delphi technique*. Mississippi State University: unpublished dissertation.

Connor, N. & Roberts, T. G. (2013). Competencies and Experiences Needed by Pre-service Agricultural Educators to Teach Globalized Curricula: A Modified Delphi Study. *Journal of Agricultural Education, 54*(1), 8-17.

Cox, J. (1996). *Your opinion please: How to build the best questionnaires in the field of education.* Thousand Oaks, CA: Corwin Press.

Croasmun, J., Hampton, D., & Herrmann, S. (1999). *Teacher attrition: Is time running out?* University of North Carolina, Chapel Hill, North Carolina. Retrieved September 26, 2014 from http://horizon.unc.edu/projects/issues/papers/hampton.asp

Croom, D. B. (2003). Teacher Burnout in Agricultural Education. *Journal of Agricultural Education*, *44*(2), 1-13.

Crutchfield, N., Ritz, R., & Burris, S. (2013). Why agricultural educators remain in the classroom. *Journal of Agricultural Education*, *54*(2), 1-14.

Day, C. (2008). Committed for life? Variations in teachers' work, lives and effectiveness. *Journal of Educational Change*, *9*(3), 243-260.

Dalkey, N. C. (1968): Predicting the Future. Santa Monica, CA: The Rand Corporation.

Delbecq, A. L., Ven, A. H., & Gustafson, D. H. (1975). *Group techniques for program planning: a guide to nominal group and Delphi processes*. Glenview, Ill.: Scott, Foresman.

Dillman, D. (2009). *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method.* (3rd ed.). New York: John Wiley and Sons.

Doerfert, D. L. (Ed.) (2011). National research agenda: American Association for Agricultural Education’s research priority areas for 2011-2015. Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications.

Duncan, D. W., Ricketts, J. C., Peake, J. B., & Uessler, J. (2006). Teacher preparation and in-service needs of Georgia agriculture teachers. *Journal of Agricultural Education. 47*(2), 24-35.

Dyer, J., Breja, L., & Ball, A. (2003). A Delphi Study of Agriculture Teacher Perceptions of Problems in Student Retention. *Journal of Agricultural Education, 44*(2), 86-95.

Feistritzer, C. E., & Haar, C. K. (2008). Alternative routes to teaching. Upper Saddle River, NJ:

Pearson.

Flores, M.A., & Day, C. (2006). Contexts which shape and reshape new teachers' identities: A multi-perspective study. *Teaching and Teacher Education, 22*(2), 219-232.

Foster, B. B. & Finley, E. (1995). The relationship of teacher knowledge and personal development of human relation skills in agricultural education. Paper presented at the Southern Agricultural Education Research Meeting. Wilmington, NC.

Garland, R. (1991). The Mid-Point on a Rating Scale: Is It Desirable? *Marketing Bulletin. 2*(3), 66-77.

Garton, B. G. & Chung, N. (1996). The inservice needs of beginning teachers of agriculture as perceived by beginning teachers, teacher educators, and state supervisors. *Journal of Agricultural Education, 37*(3), 52-58.

Harvey, P., & Martinko, M.J. (2010). Attribution theory and motivation. In N. Borkowski (Ed.), Organizational behavior in health care, 2nd edition (147-164). Boston: Jones and Bartlett.

Heath-Camp, B., & Camp, W. G. (1990). Induction experiences and needs of beginning vocational teachers without teacher education backgrounds. *Occupational Education Forum, 19*(1), 6-16.

Heider, F. (1958). *The Psychology of Interpersonal Relations*. New York: Wiley.

Kelley, H. H. (1973). The Process of Causal Attribution. *American Psychologist. February,* 107-127.

Kelsey, K. D. (2006). Teacher attrition among women in secondary agricultural education. *Journal of Agricultural Education*, *47*(3), 117-129.

King, D., Rucker, K. J., & Duncan, D. (2013). Classroom Instruction and FFA/SAE Responsibilities Creating the Most Stress for Female Teachers in the Southeast. *Journal of Agricultural Education*, *54*(4), 195-205.

Lambert, M. D., Henry, A. L., & Tummons, J. D. (2011). How do early career agriculture teachers talk about their time? *Journal of Agricultural Education, 52*(3), 50-63.

Larsen, C. (1992). Teaching effectiveness: A principal's view. *The Agricultural Education Magazine*, *65*(3), 12-13.

Layfield, K. D. & Dobbins, T. R. (2002). Inservice needs and perceived competencies of South Carolina agricultural educators. *Journal of Agricultural Education, 43*(4), 46-55.

Lazarus, R. S., & Folkman, S. (1984). Stress, appraisal, and coping. New York, NY: Springer.

Local Program Success - Agricultural Education. (n.d.). *National FFA Orangaization*. Retrieved September 2, 2014, from https://www.ffa.org/documents/lps_guide.pdf

Lockaby, J. & Vaughn, P. (1999). Teaching values in agricultural education. *Journal of Agricultural Education, 40*(1), 74-81.

Luft, V. D. & Thompson, G. W. (1995). Factoring contributing to the effectiveness of agricultural education teachers: What students say. *The Agricultural Education Magazine, 68*(3), 23-24.

Martino, J. P. (1972). *Technological forecasting for decision making*. New York: American Elsevier Pub. Co.

Miller, W. W., Kahler, A. A., & Rheault, K. (1989). Profile of the effective vocational agriculture teacher. *Journal of Agricultural Education, 30*(2), 33-40.

Miller, W.W., & Sheild, C. L. (1984) Problems of beginning teachers of vocational agriculture in Iowa. *Journal of the American Association of Teacher Educators in Agriculture, 25*(4), 2-7.

Mishel, L., Allegretto, S., & Corcoran, S. (2008). *The Teaching Penalty: Teacher Pay Losing Ground.* Washington, DC.: Economic Policy Institute.

Moir, E. (2005). Califorina's formative assessment and support system for teachers (CFASST). *Training for support providers, year 1*. Participant's manual. October, 2005.

Moore, G. E. (1987). The status of agricultural education prior to the Smith-Hughes act. The Agricultural Education Magazine, 59(8), 8-10.

Mundt, J. P. & Connors, J. J. (1999). Problems and challenges associated with the first years of teaching agriculture: A framework for preservice and inservice education. *Journal of Agricultural Education, 40*(1), 38-48.

Myers, B. E., Dyer, J. E. & Washburn, S. G. (2005). Problems facing beginning agriculture teachers. *Journal of Agricultural Education, 46*(3), 47-55.

National Research Council. (1988). *Understanding Agriculture: New Directions for Education*. Washington, D.C.: National Academy Press.

Newcomb, L. H., McCracken, J. D., Warmbrod, J. R., & Whittington, M. S. (2004). *Methods of teaching agriculture* (3rd ed.). Upper Saddle River, N.J.: Pearson/Prentice Hall.

Niehaus, R. (2008, April). Balancing a full house and a full classroom. *Making a Difference.*

Retrieved from https://www.ffa.org/FFAResources/Publications/MakingADifference/0804/Pages/Balancing-a-Full-House-and-a-Full--Classroom.aspx#

Phipps, L. J., Osborne, E. W., Dyer, J. E., & Ball, A. L. (2008). *Handbook on agricultural education in public schools* (6th ed.). Clifton Park, NY: Thomson Delmar Learning.

Rayfield, J. & Croom, B. (2010). Program Needs of Middle School Agricultural Education Teachers: A Delphi Study. *Journal of Agricultural Education, 51*(4), 131-141.

Richardson, A. G. & Arundell, A. (1989). Characteristics of the effective teacher as perceived by pupils and teachers: A Caribbean case study. (ERIC Document Reproduction Service No. ED 311 013).

Ritz, R., Burris, S., Brashears, T., & Fraze, S. (2013). The effects of a time management professional development seminar on stress and job satisfaction of beginning agriscience teachers in West Texas. *Journal of Agricultural Education, 54*(3), 1-14.

Roberts, T. G. & Dyer, J. E. (2004). Characteristics of effective agriculture teachers. *Journal of Agricultural Education, 45*(4), 82-95.

Rosenshine, B. & Furst, N. (1971). Research on teacher performance criteria. In B. O. Smith (Ed.), *Research in Teacher Education – A Symposium* (pp. 37-72). Englewood Cliffs, NJ: Prentice Hall, Inc.

Shippy, R. D. (1981). Professional competencies needed by beginning teachers of agriculture/agribusiness. *Journal of the Association of Teacher Educators in Agriculture, 22*(1), 29-34.

Smalley, S. & Retallick, M. S. (2011). Purposes, Activities, and Documentation of Early Field Experience in Agricultural Teacher Education: A National Delphi Study. *Journal of Agricultural Education, 52*(3), 100-109.

Sutphin, H. (1981). *Positions held by teachers, teacher educators, and state supervisors about selected national issues in agricultural education.* (Electronic Thesis or Dissertation).

Suydam, M. (1983). Teaching effectiveness. *Arithmetic Teacher, 31*(2), 3.

Talbert, B. A., Camp, B. G., & Heath-Camp, G. (1994). A year in the lives of three beginning agriculture teachers. *Journal of Agricultural Education, 35*(2), 31-36.

Talbert, B. A., Vaughn, R., & Croom, D. B. (2005). *Foundations of agricultural education*. Caitlin, Ill.: Professional Educators Publications.

Torres, R., Lawver, R., & Lambert, M. (2009). Job-related stress among secondary agricultural education teachers: a comparison study. *Journal of Agricultural Education, 50*(3), 100-111.

Torres, R., Ulmer, J., & Aschenbrener, M. (2008). Workload Distribution among Agriculture Teachers. *Journal of Agricultural Education*, *49*(2), 75-87.

Ulschack, F.L. (1983). Human Resource Development: The Theory and Practice of Needs Assessment. Reston, VA: Reston Publishing Company.

VATAT. (n.d.). Vocational Agriculture Teachers Association of Texas. Retrieved March 3, 2014, from http://www.vatat.org/

Walker, W. D., Garton, B. G. & Kitchel, T. J. (2004). Job satisfaction and retention of secondary agricultural teachers. *Journal of Agricultural Education*, *45*(2), 28-38.

Weiner, B. (1974). *Achievement motivation and attribution theory*. Morristown, N.J.: General Learning Press.

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, *92*(4), 548-573.

Young, M. (1990). Characteristics of high potential and at-risk teachers. *Action in Teacher Education. 11*(4), 35-39.

Exploring Science Teachers' Perceptions Of The Curriculum For Agricultural Science Education

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Abstract

This study *explored science teachers' perceptions of the* Principles of Agriculture – Animal *curriculum developed by Curriculum for Agricultural Science Education (CASE). A convenience sample of Texas science teachers attending the Conference for the Advancement of Science Teaching resulted in collecting data from 119 participants. Participants agreed that CASE curriculum includes science concepts, applies scientific principles to real world concepts, and accurately teaches science concepts. They also agreed that an agriculture teacher could teach lessons in the CASE curriculum. The science teachers felt confident that they could teach the lessons, they have the equipment needed to teach the lessons, they would be willing to loan this equipment to agriculture teachers, they would be willing to co-teach this curriculum with an agriculture teacher, and they would be willing to assist agriculture teachers in preparing to teach this curriculum. They did not agree that their school would allocate funds for an agriculture class that is structured in the nature of the CASE curriculum. A correlation between the summated score for science teachers' perceptions of implementing the CASE curriculum was found with whether or not the science teacher taught at a school that had an existing agricultural education program and their agriculture connectedness score.*

Introduction

According to a report by the National Research Council (2009) the areas of Science, Technology, Engineering, and Math (STEM) have become "increasingly intertwined with food, fiber, and fuel production" (p. 2). This report posits that "we are now in an era of scientific agriculture" (p. 2). In 2011 the federal government committed 3.4 billion dollars to STEM education and 3% of those funds were specifically related to agriculture (National Science and Technology Council, 2011). Some would argue that agricultural education has been scientific in its nature since it started (Hillison, 1996). The integration of science into agricultural education has been widely researched. This research shows support for the integration of science in agricultural education by several different stakeholders (Balschweid & Thompson 2002; Myers, Thoron, & Thompson, 2009; Myers & Washburn, 2008; Thompson, 2001; Thompson & Warnick, 2007; Thoron & Myers, 2010; Warnick, Thompson, & Gummer, 2004). Some states support this integration so much that students can earn science credit for agriculture courses (Conroy & Walker, 2000; Johnson, 1996; Thompson, 1998; Thompson & Balschweid, 1999).

Research shows that science teachers support the integration of science into agricultural education and that collaboration between science teachers and agriculture teachers is important (Osborne & Dyer, 1998; Thompson & Warnick, 2007; Warnick, et al. 2004). In a study of

Oregon science teachers' perceptions regarding the integration of science into agricultural education curriculum, Warnick et al. (2004) identified barriers that science teachers felt would hinder the integration. These barriers were science teachers' lack of agriculture background, funding and equipment, agriscience laboratories, and agriculture curriculum that integrates science (Warnick et al., 2004).

Similar concerns were found in general research about STEM education. A study of math and science teachers who were involved in STEM integration training revealed that they find the most value in training on collaborative lesson development. Math teachers indicated that lesson demonstration and providing a context for learning math concepts was beneficial. Science teachers emphasized that there is a lack of time for much integration of other subjects into their class (Beaudoin, Johnston, Jones, & Waggett, 2013). Another study, focused on integrating science into Career and Technical Education (CTE), stressed that CTE teachers need to connect with science teachers to enhance science integration in their classes (Spindler & Greiman, 2013).

Curriculum for Agricultural Science Education (CASE) claims to integrate science into its curriculum (CASE, 2014). The lessons included in this curriculum are currently aligned to the National Science Education Standards and all new or revised courses will be aligned to Next Generation Science Standards (S. A. Smith, personal communication, January 24, 2015). Studies have focused on the implementation of CASE (Heintz & Retallick, 2014; Lambert, Velez, & Elliott, 2014) but research is lacking on science teachers' perceptions of the CASE curriculum. Knowing the perceptions of science teachers would aid in collaboration efforts between agriculture and science teachers.

This study addressed Priority Five, Efficient and Effective Agricultural Education Programs, of the National Research Agenda for the American Association for Agricultural Education (Doerfert, 2011).

Theoretical Framework

The Theory of Planned Behavior (Ajzen, 1991) provided a theoretical framework for this study. Similar studies have looked at the perceptions of science teachers toward the integration of science into agricultural education which used this theory as a framework (Osborne & Dyer, 1998; Thompson & Warnick, 2007; Warnick et al., 2004). In this study the target behavior of science teachers is that they collaborate with agriculture teachers who are using the CASE curriculum to integrate science into their agriculture classrooms. According to the Theory of Planned Behavior, this behavior is directly related to the science teachers' intentions and their intentions are influenced by their attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991). This study focused on the attitudes of science teachers by analyzing science teachers' perceptions of CASE lessons.

Purpose and Objectives

The purpose of this study was to explore science teachers' perceptions of CASE curriculum. Four objectives were identified to achieve this purpose.

1. Determine participants' agriculture connectedness score.
2. Determine science teachers' perceptions of CASE curriculum.
3. Determine science teachers' perceptions of implementing CASE curriculum.
4. Explore key demographic characteristics' (school, agriculture connectedness, teaching experience, gender, and age) relationships to science teachers' perceptions of CASE curriculum and/or implementation of the CASE curriculum.

Methods and Procedures

This study utilized a descriptive survey design using a researcher developed instrument. This study required the participants to review a lesson before answering the survey so the instrument was kept at a minimum in hopes that the participants would not get fatigued and choose not to complete the instrument. Ary, Jacobs, & Sorensen (2010) suggested keeping questionnaires as short as possible to help ensure that participants will finish it. The instrument consisted of 19 items and 15 demographic questions. The first 19 items provided a four-point Likert scale (1 = strongly disagree, 4 = strongly agree). Three of these items were reverse coded. Demographic questions were added to gain information about the participants' age, gender, teaching experience, certification areas, school size, and agricultural connectedness. When developing an instrument it is important to make sure it is valid. Face validity refers to the extent in which the instrument measures what it claims to measure (Ary et al, 2010). A panel of experts determined the face and content validity of the instrument. The panel of experts consisted of university faculty in agricultural education, the CASE Professional Development Coordinator, a human resource director for a Texas school district, and science teachers. A pilot study consisting of 16 science teachers was conducted on the first day of the three day conference to determine the reliability of the instrument. That pilot study resulted in a Cronbach's Alpha of .69, according to Ary et al. (2010) moderate reliabilities of .60 to .70 are acceptable on measures of personality factors. Field (2009) explained that surveys with fewer items and less participants typically have a lower Cronbach's alpha thus the reliability of this pilot study was deemed acceptable. Three items were reworded in an attempt to increase the reliability. The actual instrument was administered on days two and three of the conference. Post hoc reliability was calculated after the survey was taken (n = 119) and resulted in Cronbach's alpha of .81.

Researchers attended the Conference for the Advancement of Science Teaching, stood at a booth in the trade show, and asked science teachers in attendance to participate in the study. Teachers who participated were entered into a prize drawing for one of six, $100 gift cards. Teachers who volunteered to participate in the study were asked to review a randomly selected CASE lesson from the *Principles of Agriculture – Animal* course and then complete an electronic survey on a provided iPad. Both of these tasks were completed at the booth as soon as the teachers volunteered to participate. There were 27 lessons in this CASE course. The first lesson dealt with organizing a notebook for the course and the last lesson was a student project that culminates the knowledge gained throughout the course. These two lessons were not aligned to any National Science Standards and thus were excluded from the sample of lessons the participants reviewed. The remaining lessons were printed and each lesson was spiral bound separately. Teachers who volunteered to participate in the study had as much time as they needed to review the lesson that was randomly chosen for them. Each lesson was reviewed by a minimum of four participants and a maximum of 12 participants. The lessons included all activities, projects, problems, and presentations that were a part of that lesson. After the participants reviewed the lesson they completed the survey. The survey was administered electronically through Qualtrics.

The target population was Texas science teachers attending the Science Teachers Association of Texas, Conference for the Advancement of Science Teaching. A convenience sample of 119 science teachers who volunteered to take the survey was obtained.

The average age of participants in this study was 39.05 (*SD* = 10.60) years. The respondents had a mean of 11.27 (*SD* = 9.42) years of total teaching experience. The average years of teaching at their current school was 5.55 (*SD* = 5.93) and the mean number of years teaching science was 10.26 (*SD* = 8.79).

Most of the participants were female (102, 85.7%). The largest percentage (36.1%, 43) of the participants came from 4A schools (465 to 1059 students) and the smallest percentage (5.9%, 7) came from 1A schools (104 students or fewer). The number of participants who taught in schools with agricultural education programs and those who taught in schools without agricultural education programs was split fairly evenly with 58 participants (48.7%) in schools with agricultural education programs and 54 (42.9%) in schools without agricultural education programs. Eight participants (6.7%) did not know if the school they taught in had an agricultural education program. The majority of participants said their school did not award science credit for any agriculture classes (56, 47%) or they did not know if science credit was awarded to students who took agriculture classes (32, 26.8%). But 28 participants (23.5%) said their school did award science credit for agriculture classes.

The largest percentage (28.6%, 34) of participants was currently teaching biology followed closely by eighth grade science (21.8%, 26). It is important to note some teachers do not teach the same class all day, they teach multiple classes throughout the day, so the sum of the frequency counts was more than 119. Participants were also asked what subjects they had taught in the past. Biology and seventh grade science were both the most frequent (26, 21.8% each), followed closely by Integrated Physics and Chemistry (24, 20.2%). Of the 119 participants, two (1.7%) were currently teaching animal science, four (3.4%) were currently teaching advanced animal science, and one (.8%) was currently teaching another agriculture class. In the past, seven (5.9%) had taught animal science, five (4.2%) had taught advanced animal science, and eight (6.7%) had taught some other agriculture class.

The majority of the participants had a general science certification, 35 (29.4%) had elementary (PK - 6) general science certificate, 43 (36.1%) had a middle school (7 - 8) general science certificate, and 36 (30.3%) had a high school (9 - 12) general science certificate. Several of the participants had certifications outside of the field of science with the most frequent (18, 15.1%) being in elementary (PK - 6) math. It is important to note 10 (8.4%) participants had a high school (9 - 12) certification in agriculture and four (3.4%) had a middle school (7 – 8) certification in agriculture. Also several participants had an administration certificate, seven

(5.9%) at the elementary (PK - 6) level, nine (7.6%) at the middle school level, and 11 (9.2%) at the high school level.

Data Analysis

The IBM Statistical Package for Social Science (SPSS) 20 was used for data analysis. Measures of central tendency and frequency counts were used to analyze the data for this study.

Five demographic questions were combined to get an agriculture connectedness score. "Do you currently have any association with production agriculture or an agriculture related business?," "Have you had any association with production agriculture or an agriculture related business in the past?," and "Did you participate in 4-H as a youth?" allowed the participants to select yes or no. Answers of no were valued at zero points and answers of yes were valued at one point. The fourth question was "How many years were you enrolled in agriculture education in high school?" If the participant selected none it was worth zero points, one year was worth one point, two years was worth two points, three years was worth three points, and four years was worth four points. Also, one point was awarded to students who were certified to teach agriculture. Therefore, the minimum agriculture connectedness score a person could receive was zero which would indicate no real connection to agriculture. The highest agriculture connectedness score a person could receive was eight which was an indication that they had several connections to agriculture.

For items on the instrument that were measured with a Likert scale only, means and standard deviations were calculated. Using Likert scales allows a point value to be assigned to each response in order to calculate measures of central tendency (Ary et al, 2010). Summated averages were calculated for objectives two and three. Eight items addressed objective two. This included one question that was reverse coded. This item was recoded before calculating the summated average score for science teachers' perceptions of the CASE curriculum. Objective three was addressed by 11 items on the instrument. Two of these items were reverse coded. They were recoded before a summated average score was calculated for science teachers' perceptions of implementing CASE curriculum.

Bivariate correlations were calculated for objective four. Demographic information for the participants' teaching experience, school, gender, age, and agriculture connectedness were chosen for these correlations. The classes that teachers were currently teaching or had taught, as well as their certifications were not used as some participants had multiple certifications and taught multiple classes.

Limitations

A limitation of this study was that it utilized convenience sampling and thus the findings cannot be generalized beyond the sample of this study. In order to generalize the findings the study would have to be repeated using probability sampling. However, the findings from this study are still useful in understanding what science teachers think about the CASE curriculum.

The information is useful to further develop an instrument for future administration to a probabilistic sample.

Findings/Results

The purpose of this study was to explore science teachers' perceptions of CASE curriculum. This purpose was achieved by analyzing responses of 119 Texas science teachers who were attending the Science Teachers of Texas, Conference for the Advancement of Science Teaching. The findings of this study addressed four specific objectives.

Objective 1: Determine the participants' agriculture connectedness score.

As a whole the participants were not very connected to agriculture. Of 119 participants, 95 (79.8%) indicated they were not currently associated with any type of production agriculture or agriculture related business and 83 (69.7%) said they had never been associated with any type of production agriculture or agriculture related business (see Table 1). Likewise, 84 (70.6%) designated they did not participate in 4-H as a youth and 91 (76.5%) specified they did not participate in an agricultural education program while in high school. Agriculture connectedness scores were calculated with a range of zero to eight. A score of zero indicted no connection to agriculture, while a score of eight indicated the participant had several connections to agriculture. The majority of the participants in this study (f = 64, 53.8%) had no connection to agriculture as they had a score of zero for agriculture connectedness.

Table 1
Participants Connectedness to Agriculture (N = 119)

Item	Response	*f*	%
Currently Have an Association to Production Agriculture or an Agricultural Related Business	Yes	24	20.2
	No	95	79.8
Have Had an Association to Production Agriculture or an Agricultural Related Business in the Past	Yes	36	30.3
	No	83	69.7
Participated in 4-H as a Youth	Yes	35	29.4
	No	84	70.6
Years Enrolled in Agricultural Education in High School	None	91	76.5
	1 Year	11	9.2
	2 Years	5	4.2
	3 Years	3	2.5
	4 Years	9	7.6
Agriculture Connectedness Score	0	64	53.8
	1	13	10.9
	2	16	13.4
	3	6	5.0
	4	9	7.6
	5	2	1.7
	6	3	2.5
	7	6	5.0
	8	0	0.0

Objective 2: Determine science teachers' perceptions of CASE curriculum.

The instrument contained eight items that addressed the science teachers' perceptions of the CASE curriculum. The items were accompanied by a four-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree). Two items had the highest means (M = 3.73, SD = 0.45), "This lesson includes science concepts" and "This lesson applies scientific principles to real world concepts" (see Table 2). Only two statements had mean scores below 3.00 and one of them was reverse coded. "This lesson would fit a science class better than an agriculture class" had a mean of 2.56 (SD = 0.73) and the reverse coded item "Students in my school do not learn academic concepts in agriculture classes" had a mean of 2.18 (SD = 0.93). The reverse coded item was recoded before calculating the summated score for this construct. The summated score for science teachers' perceptions of the CASE curriculum was 3.30 with a standard deviation of 0.35.

Table 2

Science Teachers' Perceptions of CASE Curriculum

Statement	*n*	*M*	*SD*
This lesson includes science concepts	119	3.73	0.45
This lesson applies scientific principles to real world concepts	119	3.73	0.45
This lesson accurately teaches science concepts	119	3.61	0.49
Students at my school would benefit from an agriculture class structured in the manner of this lesson	119	3.44	0.56
If students learn this content they will perform better in my class	119	3.33	0.63
Students at my school would be interested in an agriculture class structured in the manner of this lesson	118	3.26	0.66
This lesson would fit a science class better than an agriculture class	118	2.56	0.73
Students in my school do not learn academic concepts in agriculture classes*	114	2.18	0.93
Summated Average Perception of CASE Curriculum Score	114	3.30	0.35

Note. 1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree
** indicates the item was reverse coded*

Objective 3: Determine science teachers' perceptions of implementing CASE curriculum.

The instrument contained 11 items that related to the implementation of the CASE curriculum. The item with the highest mean (M = 3.69, SD = 0.50) was "An agriculture teacher could teach this lesson" (see Table 3). Only three items had means below 3.00 and two of those were reverse coded. The two items that were reverse coded were: "I do NOT have enough knowledge of agriculture to teach this lesson" (M = 2.03, SD = 0.86) and "Agriculture teachers do NOT have enough science knowledge to teach this lesson" (M = 1.83, SD = 0.66). The other item that fell below a mean of 3.00 was "My school would allocate funds for an agriculture class that is structured in the manner of this class" (*M* = 2.76, *SD* = 0.79). The two reverse coded items were recoded before the summated score for this construct was calculated. The summated average score for science teachers' perceptions of implementing the CASE curriculum was 3.22 with a standard deviation of 0.39.

Table 3

Science Teachers' Perceptions of the Implementation of CASE curriculum

Statement	*n*	*M*	*SD*
An agriculture teacher could teach this lesson	118	3.69	0.50
I feel confident that I could teach this lesson	119	3.51	0.65
I would be willing to co-teach this lesson with my school's agriculture teacher	118	3.42	0.63
I would be willing to teach an agriculture class that is structured in the manner of this class	119	3.33	0.68
I am willing to assist my school's agriculture teacher to prepare to teach this lesson	118	3.31	0.64
I would be willing to loan the equipment needed for this lesson to the agriculture teacher at my school	116	3.19	0.85
I have the equipment needed to teach this lesson	119	3.01	0.64
Teachers and administrators at my school would support an agriculture class taught with the teaching philosophies of this lesson	117	3.01	0.73
My school would allocate funds for an agriculture class that is structured in the manner of this class	116	2.76	0.79
I do NOT have enough knowledge of agriculture to teach this lesson*	118	2.03	0.86
Agriculture teachers do NOT have enough science knowledge to teach this lesson*	118	1.83	0.66
Summated Average Perception of Implementing CASE Curriculum Score	114	3.22	0.39

Note. *1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree*
** indicates the item was reverse coded*

Objective 4: Explore key demographic characteristics' (school, agriculture connectedness, teaching experience, gender, and age) relationships to science teachers' perceptions of CASE curriculum and/or implementation of the CASE curriculum.

Bivariate correlations between selected demographic characteristics and summated average scores for science teachers' perceptions of CASE and science teachers' perceptions of CASE implementation were calculated. All correlations with the summated average score for science teachers' perceptions of CASE were low or negligible (Davis, 1971) (See Table 4). However, two demographic characteristics showed a moderate relationship with science teachers' perceptions of implementing the CASE curriculum. As part of the demographic information, participants were asked if their current school had an agricultural science program. If they answered yes, a one was entered in the data and if they answered no, a two was entered. The relationship between this factor and the summated score for objective three was -.42. This indicates a negative relationship but when analyzing that "no" equaled a two in the data, this is interpreted as if participants' schools did not have an agricultural education program their summated average score for science teachers' perceptions of CASE implementation was lower. The magnitude of the relationship between the summated score for science teachers' perceptions of CASE implementation and the participant's summated agriculture connectedness score was similar (r = .41) but had a positive relationship. The data showed a moderate association and reveals the more connected the participant is to agriculture the more positively they responded to CASE implementation statements.

Table 4

Correlations Between Selected Demographics and Summated Averages of Science Teachers' Perceptions of CASE and CASE Implementation (N = 119)

Demographic Statement	Perceptions of CASE	Perceptions of CASE Implementation
Current School has an Agricultural Education Program [a] (r_{pb})	-.11	-.42
Agriculture Connectedness [b] (r)	.13	.41
Students at School Receive Science Credit for Agriculture Classes [a] (r_{pb})	.08	-.21
Gender [c] (r_{pb})	.17	.17
Years Teaching Science (r)	.04	.15
Years Teaching at Current School (r)	.09	.14
Years Teaching (r)	.02	.12
School Size [d] (r_{pb})	-.02	-.02
Age (r)	-.05	.01

Note. [a] *Yes = 1, No = 2*
[b] *4 = no connections to agriculture, 12 = strong connection to agriculture*
[c] *Male = 1, Female = 2*
[d] *6A = 1, 5A = 2, 4A = 3, 3A = 4, 2A = 5, 1A = 6*

Conclusions/Implications/Recommendations

Most of the participants of this study were female (85.7%) and were an average of 39 years of age. While their teaching experience varied from their first year of teaching to their 44th year of teaching, the mean was 11.27 (SD = 9.42) years of teaching. The mean of 10.26 (SD = 8.79) years teaching science indicated that these teachers had mainly taught science but a few had taught other subjects. This could also be seen when examining their certifications as some indicated having certifications outside of science. Math was the most common certification outside of science, but 10 individuals did have a certification to teach agriculture. Biology was the most frequently taught class by the participants of this study. All size schools were represented by the participants but most taught at a 4A schools. About half of the participants taught at a school that had an agricultural education program and approximately 7% did not know if their school had an agriculture program. When asked if their school offered science credit for any agriculture classes approximately half answered no, although a quarter did not know. Demographic questions regarding the participants' connectedness to agriculture indicated that over half of the participants had no connection to agriculture.

When making an effort to collaborate with science teachers, agriculture teachers should keep these demographics in mind. It is very possible that the science teacher has no connection to agriculture and does not understand the subject matter. This notion is supported by previous research that identified science teachers' lack of agriculture background as a barrier to integrating science into agricultural education (Warnick et al., 2004). It is recommended that agriculture teachers be proactive in building professional relationships with their school's science teachers. Through these relationships agriculture teachers can educate science teachers about agriculture and how it involves science. These relationships will also aid in collaboration efforts.

When examining the science teachers' perspectives of the *Principles of Agriculture – Animal* CASE curriculum, the data revealed that science teachers agree that the curriculum integrates scientific concepts. Science teachers felt that students at their school would benefit from an agriculture class structured in the manner of the CASE curriculum and if students learned the content in the lesson they reviewed, it would help the students perform better in their science class. Science teachers also agreed students at their school would be interested in an agriculture class structured in the manner of the CASE curriculum. Since approximately half of the participants indicated that their school did not have an agricultural education program, utilizing the CASE curriculum could be advantageous to starting agricultural education programs in these schools. Furthermore, if existing agricultural education programs utilize the CASE curriculum they could attract students to their program that may not traditionally take an agriculture class. It is recommended that agriculture teachers evaluate the curriculum that they are currently using to determine if it meets the needs of their students and their school district. By updating their curriculum and integrating more science into their classroom they could increase the enrollment in their agricultural education program and reinforce the scientific material that students are learning in their science classes.

Science teachers had an optimistic attitude toward the implementation of CASE curriculum. Data indicated the participants thought agriculture teachers had enough science knowledge to teach the lessons and the participants felt confident they could teach the lesson. The science teachers indicated they had the equipment needed to teach the lesson and they would be willing to loan the needed equipment to the agriculture teacher at their school. Further, science teachers showed a willingness to co-teach with an agriculture teacher and help an agriculture teacher prepare to teach the lesson. However, science teachers did not agree that their school would allocate funds for an agriculture class structured in the manner of the CASE curriculum. Lack of funding has been identified as a barrier to integrating science into agricultural education in a number of studies (Balschweid & Thompson, 2002; Myers & Thompson, 2009; Myers & Washburn, 2008; Thompson, 2001). More specifically, science teachers identified lack of funding as a barrier to science integration when studied by Warnick et al. (2004). This study suggests science teachers are willing to collaborate with agriculture teachers in implementing CASE curriculum but are concerned that adequate funding would not be provided by their school.

Efforts should be made to inform agriculture teachers that science teachers are willing to work with them and support the integration of science into agricultural education. Agriculture teachers need to seek assistance from their science teachers when they need equipment for a lesson. Since funding is continuously found to be a barrier it might be advantageous to set up a partnership with the science department to use their equipment when possible. This partnership could be beneficial to both departments as new equipment could be purchased through the budgets of both departments and shared. Another recommendation is for agriculture teachers to seek funding outside of the school district. There are grants available specifically to buy equipment/supplies for CASE lessons. There are also other sources that could be utilized to receive outside funding.

When examining the summated scores for science teachers' perceptions of the CASE curriculum with their demographic information, only small or negligible (Davis, 1971) correlations were found. It is interesting that even though the majority of the participants had no connection to agriculture they still had a positive attitude toward the CASE curriculum and felt it integrated science concepts. On the other hand evaluating the summated averages for science teachers' perceptions of implementing the CASE curriculum with the demographic information showed two moderate associations. The data suggests participants who came from schools with agriculture programs had higher summated averages for the implementation of the CASE curriculum. This could suggest that teachers who taught in schools with an agricultural education program thought more positively about assisting with the implementation of the curriculum. Those who did not teach at a school with an agricultural education program scored the items lower in this section, this may be because they were not as aware of an agriculture teacher's abilities and had no agriculture teacher to work with.

There was also a moderate (Davis, 1971) relationship ($r = .41$) to the participants' agriculture connectedness score and the summated average score for science teachers' perceptions of implementing the CASE curriculum. This relationship indicates science teachers who are more connected to agriculture are more likely to feel confident to teach the subject matter; co-teach with an agriculture teacher; assist an agriculture teacher in preparing to teach this lesson; loan equipment needed for this lesson; as well as the other items found in this construct. This is a logical finding as one would assume science teachers with an agriculture background would be more willing to work with their agriculture teacher.

A recommendation for practice is that training be provided through teacher preparation programs and through professional development to help agriculture teachers and science teachers develop strategies for collaborating with each other. It would also be helpful to provide instruction for integrating science into agriculture and agriculture into science. Administrators could also assist by aligning the conference periods of agriculture teachers and science teachers so they may use that time to collaborate.

Recommendations for future research include further development of this instrument and to conduct studies with probabilistic sampling so the results can be generalized. A qualitative study involving agriculture teachers who are using the CASE curriculum and are collaborating with science teachers could add more descriptive data to this subject. It would also be beneficial to request a sample of science teachers to participate in a CASE Institute and conduct a qualitative study of their perceptions. Other studies associated with the CASE curriculum, should explore standardized science achievement scores of students who have completed an entire CASE pathway and compare those to students' scores who have taken four years of agriculture classes that have not utilized the CASE curriculum as well as students who have not had any agriculture classes. Since funding seems to be a barrier to implementing the CASE curriculum a study should focus on schools that have implemented this curriculum and identify how they funded the program. An additional study should focus on the views students have about the CASE curriculum.

References

Ajzen, I, (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50(*2), 179-211.

Ary, D., Jacobs, L. C. & Sorensen, C. (2010). *Introduction to research in education*. (8th ed.). Belmont, CA: Wadsworth/Thomson Learning.

Balschweid, M. A. & Thompson, G. W (2002). Integrating science in agricultural education: Attitudes of Indiana agricultural science and business teachers. *Journal of Agricultural Education, 43*(2), 1-10. doi: 10.5032/jae.2002.02001

Beaudoin, C., Johnston, P. C., Jones, L. B., & Waggett, R. J. (2013). University support of secondary STEM teachers through professional development. *Education, 133*(3), 330-339.

Conroy, C. A. & Walker, N. J. (2000). An examination of integration of academic and vocational subject matter in the aquaculture classroom. *Journal of Agricultural Education, 41*(2), 54-64. doi: 10.5032./jae.2000.02054

Curriculum for Agricultural Science Education. (2014). *CASE program description*. http://www.case4learning.org/about-case/promotional-tools.html.

Davis, J. A. (1971). *Elementary survey analysis.* Englewood Cliffs, NJ: Prentice-Hall.

Doerfert, D. L. (Ed.) (2011). National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015. Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications.

Field, A. (2009). *Discovering statistics using SPSS*. (3rd ed.). Los Angeles, CA: SAGE.

Heintz, M & Retallick, M. (2014). The adoption of the CASE curriculum in Iowa. *Poster Session Proceedings: American Association of Agricultural Education Research Conference*, Salt Lake City, UT. Abstract retrieved from http://aaaeonline.org/uploads/allconferences/5-8014_148_2014_AAAE_Poster_Proceedings.pdf

Hillison, J. (1996). The origins of agriscience: Or where did all that scientific agriculture come from? *Journal of Agricultural Education*, *37*(4), 8-13. doi: 10.5032/jae.1996.04008

Johnson, D. (1996). Science credit for agriculture: Perceived support, preferred implementation methods, and teacher science course work. *Journal of Agricultural Education. 37*(1), 22-30. doi: 10.5032/jae31996.01022

Lambert, M. D., Velez, J. J., & Elliott, K. M. (2014). What are the teachers' experiences when implementing the Curriculum for Agricultural Science Education? *Journal of Agricultural Education*, *55*(4), 100-115. doi: 10.5032/jae.2014.04100

Myers, B. E., Thoron, A. C., & Thompson, G. W. (2009). Perceptions of the National Agriscience Teacher Academy toward integrating science into school-based agricultural education curriculum. *Journal of Agricultural Education*, *50*(4), 120-133. doi: 10.5032/jae.2009.04120

Myers, B. E. & Washburn, S. G. (2008). Integrating science in the agriculture curriculum: agriculture teacher perceptions of the opportunities, barriers, and impact on student enrollment. *Journal of Agricultural Education, 49*(2), 27-37. doi: 10.5032/jae.2008.02027

National Research Council (2009). *Transforming agricultural education for a changing world.* Washington, D. C.: The National Academies Press.

National Science and Technology Council, Committee on STEM Education. (2011). *Report of The Federal Science, Technology, Engineering, and Math (STEM) Education Portfolio.* Retrieved from http://files.erik.ed.gov/fulltext/ED542910.pdf

Osborne, E. W. & Dyer, J. E. (1998). Attitudes of Illinois high school science teachers toward educational programs in agriculture. *Journal of Agricultural Education, 39*(1), 8-16. doi:10.5032/jae.1998.01008

Spindler, M., & Greiman, B. C. (2013). CTE Teachers and the Process of CTE and Science Content Integration. *Career and Technical Education Research*. *38*(2), 125-146.

Thompson, G. W. (1998). Implications of integrating science in secondary education programs. *Journal of Agricultural Education. 39*(4), 75-85. doi: 10.5032/jae.1998.04076

Thompson, G. W. (2001). Perceptions of Oregon secondary principals regarding integrating science into agricultural science and technology programs. *Journal of Agricultural Education, 42*(1), 50-60. doi: 10.5032/jae.2001.01050

Thompson, G. W. & Balschweid, M. A. (1999). Attitudes of Oregon agricultural science and technology teachers toward integrating science. *Journal of Agricultural Education. 40*(3), 21-29. doi: 10.5032/jae.1999.03021

Thompson, G. W. & Warnick, B. K. (2007). Integrating science into the agricultural education curriculum: Do science and agriculture teachers agree? *Journal of Agricultural Education, 48*(3), 1-12. doi: 10.5032/jae.2007.03001

Thoron, A. C. & Myers, B. E. (2010). Perceptions of preservice teachers toward integrating science into school-based agricultural education curriculum. *Journal of Agricultural Education, 51*(2), 70-80. doi: 10.5032/jae.2010.02070

Warnick, B. K, Thompson, G. W., & Gummer, E. S. (2004). Perceptions of science teachers regarding the integration of science into the agricultural education curriculum. *Journal of Agricultural Education, 45*(1), 62-73. doi: 10.5032/jae.2004.01

Self-Regulated Learning in an Online Agriculture Course

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Abstract

For students to be successful in the online learning environment, they must make the change from passive learners into active learners. Students who successfully regulate and change their learning know where and how to acquire the knowledge needed to be successful in the online environment. Introducing students early through dual enrollment programs can ensure students have the necessary skills as a college student. This project sought to determine the online self-regulated learning level of students in an online agriculture course. Students were found to have the highest self-regulation within environmental structuring and goal setting. The lowest online learning self-regulation was in the area of task strategies. Females had a higher level of self-regulated online learning while there was found to be little difference by ethnicity. Low correlations were found between students' experience with online courses and their perceived online self-regulated learning level. Students in an online agriculture dual enrolment course are encouraged to develop goals and at the conclusion complete a self-evaluation of their learning. Research should continue to help researchers understand and properly identify any personal, behavioral or environmental factors that influence secondary students' self-regulated learning in an online agriculture dual enrollment course.

Introduction

The past 20 years have been witness to dramatic change in student opportunities for learning. Federal student achievement initiatives designed to quantify student progress towards earned college degrees and certification (Pettitt & Prince, 2010), has resulted in Common Core State Standards (Handley-More, Hollenbeck, Orentlicher, & Wall, 2013), Massive Open Online Courses (MOOCs) (Allen & Seaman, 2013), and online learning courses that have realized a 400% increase in educational delivery over the past decade (Allen & Seaman, 2013). Researchers have identified that 13% of all students were taking online courses (Christensen, Horn, Caldera, & Soares, 2011), with enrollment in online courses increasing at a slightlty higher rate than traditional courses (Allen & Seaman, 2008). In the Fall of 2012 there were more than 7.12 million post-secondary students taking at least one online course, accounting for 33% of the total enrollment in college courses (Allen & Seaman, 2014), indicating a need for research targeting self-regulated learning in the online environment.

For students to advance and achieve their educational goals, they must be successful in their courses, be it face-to-face, online or a hybrid model. To be successful in online courses students must have management of their learner autonomy and practice individual responsibility (Andrade & Bunker, 2009; Harrell, 2008). However, those students that do not practice individual responsibility, and are not persistent towards achieving their educational goals run the risk of attrition in an online environment (Hart, 2012). According to Hart (2012), multiple factors exist that are associated with the persistence necessary for the successful completion of an online educational experience, those factors ". . . include satisfaction with online learning, a sense of belonging to the learning community, motivation, peer, and family support, time management skills, and increased communication with the instructor" (p. 19).

Students must learn self-regulation skills over time. If expected to autonomously acquire these skills, most students will not be successful when transitioning into an online course (Artino, 2009; Harell, 2008). A lack of appropriate preparation can have a negative influence on student retention and academic performance (Bol & Garner, 2011; Lynch & Dembo, 2004; Swanson, 2008). For students to be successful in the online learning environment, they must make the change from passive learners into active learners. A passive learning environment is one that is often seen as the traditional mode of teaching, one where the teacher is the primary delivery mode, providing content in the form of lecture (Smart, Witt, & Scott, 2012). Whereas the active learner model charges students with acquiring knowledge through a constructivist based approach, one where the student has to utilize prior knowledge to assist in forming new educational concepts (Prince & Felder, 2006).

Students who successfully regulate and change their learning know where and how to acquire the knowledge needed to be successful in the online environment (Cunningham & Billingsley, 2003). Traits exhibited by students who regulate their learning include: thinking critically, takes responsibility for their own learning, and actively participating in the learning process (Chung, 2000). Self-regulated learning and learner autonomy is critical to student success in the online learning environment (Lynch & Dembo, 2004). Previous research has found that there is significant value in self-regulated learning to student success, especially in online and blended courses (Hodges, 2005; Kramarski & Gutman, 2006; Kitsantas & Dabbagh, 2010).

In 2006, a study examined the effects of self-regulated learning behaviors and epistemological beliefs on learner outcomes in the online learning environment while controlling for student computer self-efficacy and prior academic achievement (Bell, 2006). In a sample of 201 undergraduate students enrolled in a web-based program, the researcher did not find epistemological beliefs to be a significant predictor of academic achievement in the online learning environment. However evidence was found to support the association of self-regulated learning skills with positive academic achievement among online learners.

Introducing students early to online and blended course through dual enrollment programs can help ensure students have the necessary skills to be successful as a full time college student. The research presented in this article was conducted with the purpose of extending the body of knowledge related to self-regulation theories in online or technology enhanced learning environments. What is more, dual enrollment courses are benefitting ". . . a wider range of students with respect to race/ethnicity, socioeconomic status, and prior academic achievement" (Kanny, 2015, p. 59).

Dual credit courses allow students to earn high school and college credit while they are taking a college course through their local community college (Estación, Cotner, D'Souza, Smith & Borman, 2011). Dual credit emerged in the 1970s and 1980s in response to a need to keep talented students challenged, to help ease transition between high school and college, to develop vocational readiness, and to reduce time to obtain a college degree (Bailey & Karp, 2003; Burns & Lewis, 2000). Students who took dual enrollment classes were found to feel better prepared for college and increased the attainment of certificates or degrees in high school (Anderson, 2010; Hughes, 2010). It was found that enrollment in hybrid online dual enrollment courses led to enhanced relationships between high schools and colleges; increased course rigor, relieved student boredom and facilitated student recruitment (Andrews, 2001; Krueger, 2006; Barnett & Hughes, 2010). Programs with this hybrid model have shown to be successful because instructors deliver the same rigorous college content while considering the pedagogical strategies that may be better at engaging secondary students (Whissemore, 2012).

Theoretical Framework

Within the context of Bandura's Social Cognitive Theory (1977; 2004), students development of self-regulated learning skills and strategies are a function of the interaction between personal, behavioral and environmental factors (Schunk, 2001). The process by which these self-regulated learning skills develop is dependent upon the previously mentioned factors changing and growing as they interact within the learning environment. If there is satisfactory progress in the learners' behavior, there will be an increase in self-efficacy and motivation. Social Cognitive theorists feel that self-regulated learning includes self-observation and self-reaction (Schunk, 2005). Self-regulated learning is an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate and control their behavior, guided and constrained by their goals and the contextual features in the environment (Pintrich, 2000).

Zimmerman (1998) proposed a three-phase model in relation to the development of self-regulated learning skills. The first of these phases is forethought, the strategic processes that precede effective learning. This can include goal setting and intrinsic motivation, which closely parallels with student success, to perform a learning task. These typically occur before the student enters the learning process. Those students that are inclined to be self-motivated prior to entering the learning process will be efficacious in their beliefs with a clearly defined expectation for their educational outcomes (Zimmerman, 1998). The second phase, the performance control stage, occurs during the learning process. The processes within this include monitoring of learning, attention and task value. Self-observation is important in this early stage for the learner to be able to reflect upon their performance in the final phase (Zimmerman, 1998). The final phase is self-reflection. In this phase individuals perform self-evaluation based upon social comparisons and will adjust their performance for the next learning task (Zimmerman & Schunk, 2001).

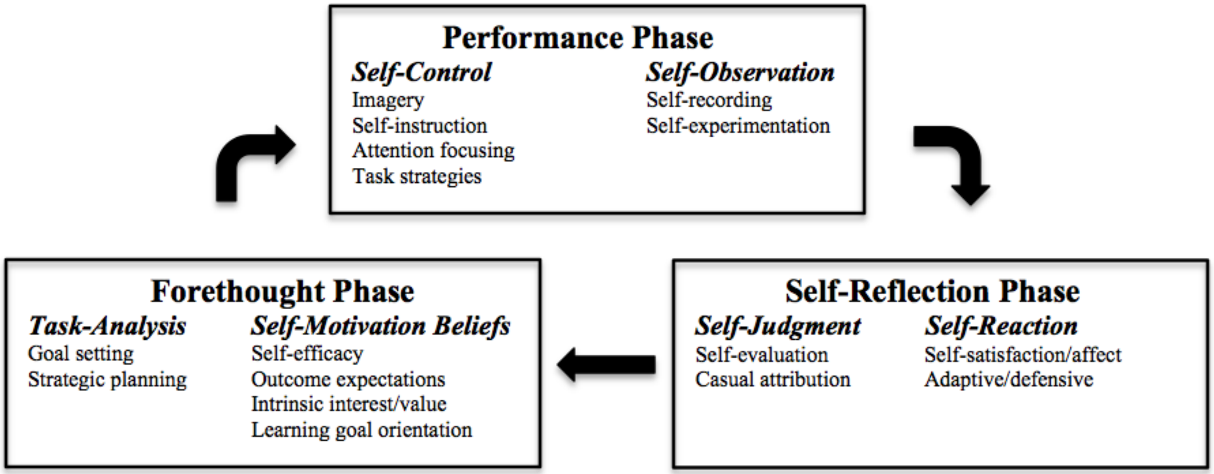

Figure 1. Zimmerman's Model of Self-Regulated Learning (Zimmerman, 1998)

It is suggested that before an individual can change and develop their self-regulated learning skills, there be an interaction of personal, behavioral or environmental factors. Through an interaction of two of these factors, an individual can change their self-regulated learning skills and strategies (Barnard-Brak, Lan & Paton, 2010). We see examples of this all the time in our classes; i.e. a student is accustomed to the educational behavior of studying little before a test. It takes the student failing a test (environmental feedback) for them to change this behavior and modify their self-regulated learning. Learners' reactions and reflections include judgments, attributions, and self-evaluations of performance (Pintrich, 2000). Learners' assess their performances and these assessments form the basis for other efforts to regulate motivation and behavior.

Purpose/Objectives

The purpose of this research study was to determine the level of online self-regulated learning within secondary students in an hybrid online dual enrollment agriculture course. The objectives of this study are as follows:

1. Identify the types of students who are taking an online dual enrollment course by demographic characteristics.

2. Determine the levels of self-regulated online learning from students in an online agriculture dual enrollment course.

3. Determine relationships between students' self-regulated online learning and demographic characteristics.

Methods

The study was a descriptive survey that implemented a correlational research design. It was a census of all secondary student enrolled in an online introduction to horticulture and introduction animal science dual enrollment course (N = 146) during the Spring 2015 semester.

Due to the nature of this study, caution should be taken when generalizing the findings beyond the population. However, generalization with caution may contribute to the knowledge base and the improvement of distance learning with the context of agriculture science courses and dual enrollment courses.

Instrumentation

To measure self-regulation in the online agriculture course, a short form of the Online Self-regulated Learning Questionnaire (OSLQ) was used (Lan, Bremer, Stevens & Mullen, 2004). The short form of the Online Self-regulated Learning Questionnaire (OSLQ) is a 24-item scale with a 5-point Likert-type response format having values ranging from strongly disagree (1) to strongly agree (5). Higher scores on this scale indicate better self-regulation in online learning by students (Barnard, Lan, & Paton, 2008). The short form was developed from an 86-item long form of the instrument by examining internal consistency and exploratory factor analyses results for data collected from the long form.

The OSLQ consists of six constructs of self-regulation in online learning: environment structuring, goal setting, time management, help seeking, task strategies and self-evaluation. Researchers looked at measures of central tendency within individual statements and constructs to measure students' level of self-regulated learning. Summated scores for this instrument range from 24 (low self-regulation) to 120 (high self-regulation).

Validity of this instrument has been established by previous studies where it has been used to investigate students' self-regulated learning in online courses through 18 different academic disciplines (Barnard, Lan, To, Patton & Lai, 2009). Previous research of the OSLQ has shown structural stability when comparing results between online and blended courses (Korkmaz & Kaya, 2012). The internal consistency of score obtained for the short form of the OSLQ in this study was $\alpha = .96$. Nunnally (1978) has suggested that reliability scores of .70 or better is acceptable when used within the context of social science research. The researcher felt that there were sufficient scores on the reliability within the individual constructs. Table one shows the findings of internal consistency.

Table 1
Internal Factor Reliability of the OSLQ Post-Hoc

Construct	Cronbach's Alpha Reliability Coefficient
Environment Structuring	.90
Goal Setting	.94
Time Management	.87
Help Seeking	.90
Task Strategies	.87
Self-Evaluation	.90

Data was collected online through a link within the students' Blackboard learning shell. The students selected for this study were those taking an online dual enrollment introduction to animal science or introduction to horticulture course (*N* = 146). These courses were offered as an online/in-class hybrid model. Students took part in all lab activities in-class with their secondary agriculture instructor and completed all assessments (tests, quizzes, discussion posts and final projects) online. The final project consisted of a student made presentation that was videotaped and submitted online. Of the students in these classes, 106 of them completed the survey, resulting in a response rate of 72.6%.

Findings

The first objective of this study was to describe the students were taking an online agriculture dual enrollment course. In regards to the demographic characteristics of secondary dual enrollment students' within this study, there were more males (67.9%) than females (19.7%) enrolled in the online courses. The school grade classifications were made up of sophomores (9.4%), juniors (54.7%) and seniors (35.8%). When asked about their ethnicity, students identified themselves as Hispanic (52%), Caucasian (33%), Native American (14%) and other (2%). Out of the 106 students who completed the survey, 80% of the students indicated English as their first language. Students came from either 1A or 2A schools in regards to the public school enrollment size classification (1A-5A). In regards to their experience with online courses, most students had taken an online course before (75%). Of those who had taken an online course, most students had only previously taken one course (40.2%). We found that 3.4% of the secondary students in this study had taken more than five online dual enrollment courses previously.

The second objective was to find the level of self-regulated learning from students taking an online agriculture dual enrollment course. Table two illustrates students' level of self-regulated learning in their online agriculture courses by measures of central tendency.

Table 2

Self-Regulated Learning of Online Dual Enrollment Students

Construct/Item	*Mean*	*Mode*	*SD*
Environment Structuring			
I choose the location where I study to avoid too much distraction	3.83	4	1.03
I find a comfortable place to study	4.01	4	0.95
I know where I can study most efficiently for my online courses	3.76	4	0.87
I choose a time with few distractions for studying	3.63	4	0.97

Goal Setting			
I set standards for my assignments in online courses	3.83	4	0.92
I set short-term as well as long-term goals)	3.78	4	0.96
I keep a high standard for my learning in my online courses	3.82	4	0.94
I set goals to help me manage studying time for my online courses	3.70	4	0.93
I don't lower the quality of my work because it is online	3.78	4	0.98
Time Management			
I allocate extra studying time for my online courses	3.53	4	0.92
I try to schedule the same time every day or week to study	3.68	4	0.84
Although we don’t meet for class, I still distribute my studying	3.66	4	0.97
Self-Evaluation			
I summarize my learning to examine knowledge gained	3.58	4	0.91
I ask myself questions about the course materials when studying	3.63	4	0.92
I communicate with my classmates to find out how I am doing	3.64	4	0.92
I communicate with classmates to find out if I am learning different	3.63	4	0.93
Help Seeking			
I find someone who is knowledgeable in course content for help	3.75	4	0.97
I share my problems with classmates online	3.66	4	1.00
I try to meet my classmates face-to-face	3.54	4	1.00
I am persistent in getting help from the instructor through email	3.48	3	1.00
Task Strategies			
I try to take more thorough notes for my online courses	3.55	4	1.06

I read aloud instructional materials posted online to fight distraction	3.34	4	1.09
I prepare my questions before joining a course discussion	3.45	4	0.96
I work extra problems in addition to the assigned ones	3.27	3	0.96
I try to take more thorough notes for my online courses	3.55	4	1.06
I read aloud instructional materials posted online to fight distraction	3.34	4	1.09
Summated Mean Score		102	

The dual-enrollment students were found to have had the highest level of self-regulated online learning within the construct of environmental structuring for the item “I find a comfortable place to study” (*M* = 4.01, *SD* = .95). The statement with the highest mean in the goal setting construct was “I set standards for my assignments in online courses” (*M* = 3.83, *SD* = .92). With a mean of 3.68 (*SD* = .84), “I try to schedule the same time every day or week to study” was the statement with the highest mean in the construct of time management. The item with the highest mean in the construct of self-evaluation was "I communicate with my classmates to find out how I am doing” (*M* = 3.64, *SD* = .92). In regard to the help-seeking construct, dual-enrollment students indicated the highest level of agreement with the statement “I find someone who is knowledgeable in course content for help” (*M* = 3.75, *SD* = .97). With a mean of 3.55 (*SD* = 1.06), “I try to take more thorough notes for my online courses” was the highest mean score within the construct of task strategies. Table three provides average students’ scores for each of the six constructs.

Table 3
Overall Self-Regulated Learning Scores by Construct

Construct	*M*	*SD*
Environment Structuring	3.81	0.96
Goal Setting	3.78	0.95
Time Management	3.62	0.91
Self-Evaluation	3.62	0.92
Help Seeking	3.61	1.02
Task Strategies	3.40	1.02

The third objective of this study sought to determine if any relationships existed between student demographic characteristics and self-regulated learning in the online environment. Female respondents reported higher self-regulated learning scores for all constructs (i.e., goal setting, environment structuring, task strategies, time management, help seeking, and self-evaluation). Goal setting (*M* = 4.01, *SD* = .90) was the construct which female dual-enrollment students reported the highest self-regulated learning score (see Table 4). Conversely, male dual-enrollment students scored the highest in the construct of environment structuring (*M* = 3.77, *SD* = .89). The task strategies construct had the lowest self-regulated learning scores for both male (*M* = 3.27, *SD* = 1.01) and female (*M* = 3.70, *SD* = .98) dual-enrollment students. The researchers also looked at ethnicity and grade-level in regards to students' self-regulated learning. These findings are presented in table five and six.

Table 4

Self-Regulated Learning Scores by Gender

Construct	Male		Female	
	M	*SD*	*M*	*SD*
Goal Setting	3.68	0.95	4.01	0.90
Environment Structuring	3.77	0.89	3.97	1.06
Task Strategies	3.27	1.01	3.70	0.98
Time Management	3.50	0.90	3.90	0.89
Help Seeking	3.51	0.99	3.82	1.05
Self-Evaluation	3.55	0.95	3.78	0.86
Summated Mean Score	85		93	

Table 5

Self-Regulated Learning Scores by Ethnicity

Ethnicity	Caucasian		Hispanic		Native American	
Construct	*M*	*SD*	*M*	SD	M	SD
Goal Setting	3.77	0.89	3.74	0.95	3.82	1.17
Environment Structuring	3.77	1.07	3.79	0.88	3.81	1.05
Time Management	3.56	0.99	3.61	0.88	3.63	1.01
Self-Evaluation	3.56	0.90	3.62	0.94	3.59	0.99
Help Seeking	3.54	0.99	3.63	1.02	3.61	1.11
Task Strategies	3.26	1.06	3.44	0.95	3.47	1.10
Summated Mean Score	86		87		88	

Table 6

Self-Regulated Learning Scores by Grade Level

Grade	10^{th} Grade		11^{th} Grade		12^{th} Grade	
Construct	*M*	*SD*	*M*	SD	M	SD
Goal Setting	3.88	1.01	3.68	1.00	4.03	0.75
Environment Structuring	3.83	1.19	3.71	0.98	3.98	0.81
Time Management	3.63	0.98	3.51	0.95	3.83	0.78
Help Seeking	3.45	1.00	3.47	1.03	3.91	0.88
Self-Evaluation	3.43	0.78	3.48	0.96	3.64	0.88
Task Strategies	3.23	0.93	3.30	1.05	3.68	0.96
Summated Mean Score	86		85		92	

The interpretations of effect size of the Point-Biserial correlational relationship were based on Davis (1971) descriptions, and are as follows: .01 to .09 – negligible; .10 to .29 – low; .30 to .49 – moderate; .50 to .69 substantial; and .70 to 1.00 – very strong. The low (Davis, 1971), positive correlation between a student having previous online course experience and the student's summated score on the Online Self-regulated Leaning Questionnaire was significant $r_{rb}(106) = .20$, $p < .05$ (see Table 5). In addition, the positive correlation with a low (Davis, 1971) association, between the summated score of the instrument and the students' grade classification was significant $r_{rb}(106) = .19$, $p < .05$.

Table 7

Correlational Relationships Between Self-Regulated Learning and Demographics (n = 106)

Item	1	2	3	4	5	6
Gender	-					
English as a second language	-.16	-				
Grade Level	-.26**	-.02	-			
School Size	-.05	.02	-.17	-		
Ethnicity	-.06	.08	-.06	.14	-	
Previous online course experience	.11	-.09	-.08	-.01	-.27**	-
Summated Score	.15	-.15	.19*	-.16	.05	.20*

Note. * indicates significance. $p < .05$. ** indicates significance. $p < .01$.

Statistically significant correlations were also found between the students gender and grade level $r_{rb}(106) = -.26$, $p < .01$, and between a student's ethnicity and previous online course experience $r_{rb}(106) = -.27$, $p < .01$. The students' summated score on the OSLQ did not have a significant correlation with any aspect of gender, English as a second language, school size, or the ethnicity of the student.

Conclusions

The students taking agriculture dual enrollment courses were of similar demographics when compared to secondary agriculture students in the state of New Mexico. We did find that there were larger percentages of Hispanic and Native American students in the dual enrollment courses than were traditionally found taking dual enrollment courses (Karp, Calcagno, Hughes, Jeong & Bailey, 2007; Hughes, 2010). Could this be a result of the demographics of [STATE]; or indicative of the suppositions of Kanny (2015) who stated that learners regardless of past contextual variables (i.e., race/ethnicity, socioeconomic status, prior academic achievement) are increasingly benefitting from dual enrollment courses. The state of New Mexico requires that students enroll in at last one dual credit or advanced placement (AP) course to successfully meet the requirements for high school graduation. With this requirement, we were not surprised to see that most students had taken an online course before. We were surprised to find that a small percentage of students have taken more than five different online courses while still in high school.

The second objective sought to determine the level of self-regulated learning of the students enrolled in an online agricultural dual enrollment course. Of the self-regulated learning scores, environment structure was the construct which dual-enrollment students recorded the highest scores. A similar study on self-regulated learning (Utsa, 2011) also found the structuring of the environment as the highest rated score in self-regulated learning. With the less restrictive schedule of asynchronous online education, it may be implied that the students feel they have more control over their environment. Conversely, the participants indicated the lowest level of agreement with the statements related to the task strategies construct. Utsa (2011), found a significant relationship between the self-regulated learning task strategies and the student’s resistance against web based teaching. The dual enrolment students’ limited experience in the online learning environment might serve as a barrier in the transition from passive to active learning. In can be implied that the secondary students, who are accustomed to the pedagogical process of learning, have not yet acquired the task strategies needed in the self-directed environment of online learning. Furthermore, Cunningham and Billingsly (2003) indicated that students who successfully regulate and transition their learning know where and how to acquire the knowledge needed to be successful in an online environment.

The third objective was to determine if a relationship existed between students’ self-regulated online learning and demographic characteristics. A significant relationship was found between previous experience in online learning and the students overall self-regulated learning. Previous research indicated that prior experience with online learning was a positive predictor of satisfaction, perceived learning, and intentions to enroll in online courses in the future (Artino, 2007). Furthermore, Zimmerman and Schunk (2001) indicated that self-regulatory skills develop across time, and stated that the source of influence appears to shift from environmental to more personal factors. Based on previous research, it can be implied that as the students gain experience in online learning, their levels of self-regulated learning will increase as well. A significant relationship was also found between the summated score of the instrument and the student’s grade classification. It can be implied that as the upperclassmen (i.e., juniors and seniors) display higher levels of self-regulated learning due to more experience in the online learning environment. Of the variables explored, no significant relationships were discovered between self-regulated learning and gender, English as a second language, ethnicity or school size.

Recommendations for Practice

It is suggested that these courses continue to be offered with both the university faculty and secondary agriculture science teachers working with these students to help them further develop their online self-regulated learning skills. Following Zimmerman's (1998) guidelines, students should be expected to make goals before taking an online dual enrollment course and at the conclusion of these courses complete a self-evaluation of their learning. The contextual features of an online hybrid dual enrollment course can provide the necessary environment to guide, and if necessary, correct actions to positively influence students' development of self-regulated learning skills. The increased rigor from college curriculum combined with the pedagogical guidance of secondary teachers may aid in the active process of self-regulated learning (Pintrich, 2000).

Previous research has shown that students develop self-regulated learning skills through problem-based learning and authentic assessments (Iran-Nejad & Chissom, 1992). Course developers are encouraged to incorporate these concepts in course objectives and create assessments that challenge students' higher order thinking skills. An example of such tasks can include students uploading a presentation that they develop, present in class and upload for grading online. The researchers also suggest that self-regulated learning be supported thought the use of consistent course feedback and an established method of self-monitoring (discussion posts, blogs, online journals, etc).

Recommendations for Research

It is clear that the enrollment of students in blended online learning environments and dual credit courses will continue to increase. Thus, assessing the self-regulatory skills of students in these types of courses is timely. Further research must be conducted to help researchers understand and properly identify any personal, behavioral or environmental factors that influence secondary students' self-regulated learning in an online agriculture dual enrollment course. By being able to identify which type of factors influence student learning, we can more readily in the growth and development of their self-regulated learning skills. The researchers suggest that future studies be performed that include a broader range of learners, including comparing the self-regulated learning of secondary and post-secondary students.

With an increased requirement by school districts in New Mexico specifying at least one dual credit or advanced placement (AP) course to successfully meet the requirements for high school graduation, how do New Mexico students rank academically with other states that have the same graduation requirements? Have these increased requirements resulted in a higher acceptance percentage for students that choose to pursue higher education degrees? Additional research targeting these questions should be also conducted.

Multiple venues and formats for on-line instruction exist and can be personalized considerably according to instructor desire and need (Davidson-Shivers, 2009). More research is needed, especially in regards to blended dual enrollment courses, to exam students' ability to self-monitor their learning. The researchers suggest future studies also look at effective pedagogical practices that encourage self-regulated learning and ways that secondary and postsecondary faculty can work together to foster this type of learning. Future research could be performed that replicates the results of the current study with respect to learners in other domains and learning environments. Previous research has shown that self-regulated learning behaviors are "highly context dependent" (Schunk, 2001), thus research should be conducted to replicate the results of the current study across several domains in order to cross-validate this study's findings.

Some questions generated from this research include; what types of interactivity exist in dual enrollment courses? Too what extent does instructor–student interaction in the online environment affect learner academic success? Further research should be conducted to determine the levels of academic success that can be correlated to the instructor–student interaction. When increased interactivity is considered detrimental with faculty in online courses, does the level of academic success decline for the learner? Additional research should be conducted in this area.

References

Allen, I. E., & Seaman, J. (2005). Growing by degrees: Online education in the United States, 2005. Sloan Consortium. Wellesley, MA: Sloan Consortium. Retrieved from http://www.onlinelearningsurvey.com/reports/growing-by-degrees.pdf

Allen, J. E., & Seaman, J. (2008). Staying the course: Online education in the United States. The Sloan Consortium. Retrieved from http://sloanconsortium.org/sites/default/files/staying_the_course-2.pdf

Allen, E. I. & Seaman, J. (2014) *Grade change: Tracking online education in the United States.* Wellesley MA: Babson College/Sloan Foundation

Andrade, M. S., & Bunker, E. L. (2009). A model for self-regulated distance language learning. *Distance Education*, *30*(1), 47–61. doi: 10.1080/01587910902845956

Andrews, H. A. (2001). *The dual credit phenomenon: Challenging secondary school students across 50 states.* Stillwater, OK: New Forums Press. Retrieved from ERIC database. (ED463823)

Anderson, J. J. (2010). *An investigation of student perceptions o f dual enrollment at a midsized western community college* (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses. (3488917)

Artino, A. R. (2009). Think, feel, act: motivational and emotional influences on military students' online academic success. *Journal of Computing in Higher Education*, *21*(2), 146–166. doi: 10.1007/s12528-009-9020-9

Bailey, T. R., & Karp, M. M. (2003). *Promoting college access and success: A review of credit-based transition programs.* Washington, DC: U.S. Department of Education. Retrieved from ERIC database. (ED482497)

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY:Freeman.

Bandura, A. (2004). Swimming against the mainstream: The early years from chilly tributary to transformative mainstream. *Behavior Research and Therapy, 42*(6), 613–630. doi:10.1016/j.brat.2004.02.001

Barnard, L., Paton, V. O., & Lan, W. Y. (2008). Online self-regulatory learning behaviors as a mediator in the relationship between online course perceptions with achievement. *International Review of Research in Open and Distance Learning*, *9*(2), 1–11. doi: 10.1080/09687761003657572

Barnard, L., Lan, W. Y., To, Y. M., Paton, V. O., & Lai, S. L. (2009). Measuring self-regulation in online and blended learning environments. *The Internet and Higher Education*, *12*(2), 1–6. doi:10.1016/j.iheduc.2008.10.005

Barnard-Brak, L., Lan, W. Y., & Paton, V. O. (2010). Profiles in self-regulated learning in the online learning environment. *International Review of Research in Open and Distance Learning, 11*(1), 61–80. doi:10.1016/j.iheduc.2010.10.005

Barnett, E., & Hughes, K. (2010). *Issue brief: Community college and high school partnerships.* New York, NY: Community College Research Center, Columbia University. Retrieved from ERIC database. (ED512397)

Bell, P. D. (2006). Can Factors Related to Self-regulated Learning and Epistemological Beliefs Predict Learning Achievement in Undergraduate Asynchronous Web-based Courses? *Perspectives in Health Information Management, 3*(7), 1–17.

Bol, L., & Garner, J. K. (2011). Challenges in supporting self-regulation in distance education environments. *Journal of Computing in Higher Education*, *23*(1), 104–123. doi: 10.1007/s12528-011-9046-7

Burns, H., & Lewis, B. (2000). Dual-Enrolled students' perceptions of the effect of classroom environment on educational experience. *The Qualitative Report*, *4*(1&2). Retrieved from http://www.nova.edu/ssss/QR/QR4-1/burns.html

Christensen, C. M., Horn, M. B., Caldera, L., & Soares, L. (2011). Disrupting college: How disruptive innovation can deliver quality and affordability to postsecondary education. *The Center for American Progress*. Retrieved from http://www.americanprogress.org/issues/2011/02/disrupting_college.html

Chung, M. (2000) The development of self-regulated learning. *Asia Pacific Education Review*, *1*(1), 55–66. doi: 10.1007/BF03026146

Davidson-Shivers, G. V. (2009). Frequency and types of instructor-interactions in online instruction. *Journal of Interactive Online Learning, 8*(1), 23–40.

Estación, A., Cotner, B. A., D'Souza, S., Smith, C. S., & Borman, K. M. (2011). Who enrolls in dual enrollment and other acceleration programs in Florida high schools? *Issues & answers.* REL 2012-No. 119. Regional Educational Laboratory Southeast. ED526313

Handley-More, D., Hollenbeck, J., Orentlicher, M. L..,& Wall, E. (2013). Education reform initiatives and school-based practice. *Early Intervention & School Special Interest Section Quarterly / American Occupational Therapy Association*, *20*(3), 1–4.

Harrell, I. L. (2008). Increasing the success of online students. *Inquiry*, *13*(1), 36–44.

Harrell, I. L. & Bower, B. L. (2011). Student characteristics that predict persistence in community college online courses. *American Journal of Distance Education*, *25*(3), 178–191. doi:10.1080/08923647.2011.590107

Hart, C. (2012). Factors associated with student persistence in an online program of study: A review of the literature. *Journal of Interactive Online Learning, 11*(1), 19–42.

Hodges, C.B. (2005). Self-regulation in web-based courses: A review and the need for research. *The Quarterly Review of Distance Education*, *6*(4), 375–383.

Hughes, K. L. (2010). Dual enrollment: Postsecondary/secondary partnerships to prepare students. *Journal of College Science Teaching,* 59(6), 12–13.

Iran-Nejad, A., Chissom, B. (1992). Contributions of active and dynamic self-regulation to learning. *Innovative Higher Education*, *17*(2), 125–136. doi: 10.1007/BF00917134

Kanny, M. A. (2015), Dual enrollment participation from the student perspective. *New Directions for Community Colleges*, *2015*(169), 59–70. doi: 10.1002/cc.20133

Karp, M. M., Calcagno, J. C., Hughes, K. L., Jeong, D., & Bailey, T. R. (2007). *The postsecondary achievement of participants in dual enrollment: "An analysis of student outcomes in two states".* Community College Research Center, Columbia University. Retrieved from ERIC database. (ED498661)

Kitsantas, A. & Dabbagh, N. (2010). *Learning to learn with integrative learning technologies (ILT): A practical guide for academic success*. Information Age Publishing

Korkmaz, O. & Kaya, S. (2012). Adapting online self-regulated learning scale into Turkish. *Online Journal of Distance Education*, *13*(1), 52–67

Krizmarski, B. & Mizrachi, N. (2006). Online discussion and self-regulated learning: Effects of instructional methods on mathematical literacy. *The Journal of Educational Research, 99*(4), 218–230.

Krueger, C. (2006). *Dual enrollment: Policy issues confronting state policymakers.* Policy

Brief. Denver, CO: Education Commission of the States. Retrieved from ERIC database. (ED4937110)

Lan, W. Y., Bremer, R., Stevens, T., & Mullen, G. (2004). Self-regulated learning in the online environment. *Paper presented at the annual meeting American Educational Research Association*, San Diego, California

Lynch, R. & Dembo, M. (2004). The relationship between self-regulation and online learning in a blended learning context. *International Review of Research in Open and Distance Learning*, *5*(2), 1–16.

Nunnally, J. (1978). *Psychometry Theory* (2nd ed.). New York: Mc-Graw Hill.

Pettitt, M., & Prince, D. (2010). Washington state's student achievement initiative. *Journal of Applied Research in the Community College*, *17*(2), 6–12.

Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology*, *92*(3), 544–555. doi: 10.1037/0022-0663.92.3.544

Pintrich, P. R. (2000). *The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner* (Eds.), Handbook of Self-Regulation (pp. 451–502). San Diego, CA: Academic

Prince, M. J., & Felder, R. M. (2006). Inductive teaching and learning methods: Definitions, comparisons, and research bases. *Journal of Engineering Education, 95*(2), 123–138. doi: 10.1002/j.2168-9830.2006.tb00884.x

Schunk, D. H. (2001). Social cognitive theory and self-regulated learning. In B. J. Zimmerman & D. H. Schunk (Eds.), Self-regulated learning and Academic Achievement: Theoretical Perspectives (2nd ed., pp. 125–151). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Schunk, D. H. (2005). Self-regulated learning: The educational legacy of Paul R. Pintrich. *Educational Psychologist*, *40*(2), 85–94. doi: 10.1207/s15326985ep4002_3

Smart, K. L., Witt, C., & Scott, J. P. (2012). Toward learner-centered teaching: An inductive approach. *Business Communication Quarterly*, *75*(4), 392–403. doi:10.1177/1080569912459752

Swanson, J. (2008). An analysis of the impact of high school dual enrollment course participation on post-secondary academic success, persistence and degree completion. *Dissertation Abstracts International: Section A. Humanities and Social Sciences*, AAT 3323472.

Whissemore, T. (2012). Dual-enrollment studies say location, rigor matter. *Community College Journal, 82*(4)*, 9.*

Zimmerman, B. J. (1998). Academic studying and the development of personal skill: A self-regulatory perspective. *Educational Psychologist, 33(3)*, 73–86. doi: 10.1080/00461520.1998.9653292

Zimmerman, B.J., & Schunk, D. H. (2001). *Self-regulated learning and academic achievement: Theoretical perspectives* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Exploring Community-Based Experiences within a Leadership Development Program

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Abstract

We explored community-based leadership experiences as a tool for leadership development within a College of Agriculture leadership development program at Oregon State University. We assessed the value of community-based experiences based on students' identified progression through the stages of the experiential learning cycle. Students' reflections indicated the community experience pushed them to participate in a concrete experience regarding leadership. Evidence also emerged that students gained new insights through reflection on their experiences. Furthermore, these experiences and reflections encouraged students to identify new conceptualizations for their leadership moving forward. Finally, after completing the program, students were poised to continue their leadership, often in new roles or in different locations. Additionally, students indicated a new perspective that has the potential to shape how they engage in future leadership endeavors. Our findings suggest important considerations for the application of community-based leadership experiences in post-secondary agriculture leadership development programs.

Introduction

Higher education exists, in part, to develop individuals ready for professional practice (Astin & Astin, 2000). Therefore, postsecondary educators should attend to what students must know to successfully engage in professional practice. Cook and Brown (1999) provided a unique way of thinking about what a person can know, suggesting knowledge and knowing are distinct forms of what can be known. Practice, the art of doing, distinguishes these two concepts. According to Cook and Brown (1999), knowledge can occur without an ability to do; whereas knowing necessitates doing. For example, the knowledge of strategies to effectively facilitate a meeting (i.e., creating an agenda, engaging participants, conflict management strategies, etc.) is separate from the ability to actually facilitate a meeting. The distinction between knowledge and knowing has implications for leadership educators who see their roles as developing individuals to be practicing leaders. Professional practice requires both knowledge and knowing, as Cook and Brown point out "[knowledge] gives shape and discipline to knowing" (1999, p. 393). Consequently, leadership educators need to facilitate an increase in students' knowledge *and* knowing, to adequately prepare them for professional practice.

Although void of the terms knowledge and knowing, Allen and Hartman (2009) point out that leadership educators struggle to include both conceptual understanding and practice as curricular foci. In fact, research suggests leadership education has focused on individual's knowledge with little attention given to their knowing (Allen & Hartman, 2009; Jenkins, 2012). An unbalanced approach, with scant attention paid to leadership knowing, fails to accomplish the goal of developing individuals ready for professional practice in leadership. In an effort to infuse practice, some leadership educators have included community-based leadership participation within their leadership development programs. However, the leadership education literature has not explored the efficacy of community-based requirements as a pedagogical tool for engaging students in leadership development. The purpose of this study is to explore whether community-based leadership participation can serve as a method for developing students' knowledge and knowing.

We sought to ground this study in a theoretical framework that adhered to the "…reciprocal interplay between knowledge and knowing" (Cook & Brown, 1999, p. 393). Our search led us to the Experiential Learning Theory (ELT; Kolb, 1984), which posits a cyclical process for learning in which learners (a) participate in a concrete experience, (b) make sense of their experience through reflections, (c) develop abstract conceptualizations based on their experience and reflections, and (d) practice these conceptualizations in new situations. We felt this theory attended to knowing (i.e., participation in concrete experience and practicing conceptualizations in new situations), knowledge (i.e., making sense of experiences through reflection and developing abstract conceptualizations), and the critical interplay between these concepts. Additionally, the cyclical nature of ELT affords us an opportunity to explore student progress through the learning cycle during their community-based leadership participation. We suggest progress through this learning cycle would provide evidence of the development of both knowledge and knowing. Specifically, we addressed the following research question: Do students' reflections on a required community-based leadership experience demonstrate progress through the experiential learning process described in the ELT?

Literature Review

This study was informed by past research addressing the salient concepts of our research question. Specifically, our review will flush out the concepts of knowledge and knowing and their importance in leadership education, assess current curricular approaches in leadership education in relation to knowledge and knowing, and explore the research on experiential learning in postsecondary education.

Applying Knowledge and Knowing to Leadership Education

Rost and Barker (2000) described a leadership education approach which prepares students for post-industrial leadership. Post-industrial leadership brings to light the "…complex social relationships among people who practice leadership" (Rost & Barker, 2000, p. 5). The post-industrial view of leadership contrasted previous perspectives of leadership, which described leadership as more directive and less relational (Zimmerman-Oster & Burkhardt, 1999). Preparing students for success as post-industrial leaders requires attention to both knowledge and knowing (Brungardt, 1996; Cook & Brown, 1999). The knowledge required for leaders to engage in the post-industrial view includes an awareness of how relationships are built, how people are motivated, and cause-and-effect relationships within interpersonal interactions (Rost & Barker, 2000). Knowing, the ability to do, within the post-industrial leadership perspective entails leaders able to build relationships, motivate people, and create change through interpersonal interactions. If the role of leadership education is to prepare leaders for post-industrial leadership, educators must build students' knowledge and knowing through their leadership development programs. In the next section, we explore common curricular approaches currently used in leadership education and consider their attention to both knowledge and knowing.

Curricular Approaches in Leadership Education

To explore the curricular approaches used in leadership education, we employed a common framework for curricular strategies within leadership education. Conger (1992) identified four categories, labeled by their desired outcomes, of leadership education approaches: personal growth, conceptual understanding, feedback, and skill building. Personal growth refers to curricula designed to increase students' understanding of their own actions, virtues, and goals. Conceptual understanding refers to curricula aimed at building students' knowledge of leadership (e.g., teaching leadership theories). Feedback, through experiences like mentoring, is designed to provide leadership learners with information on their personal strengths and weaknesses. Skill building, the final category of curricula discussed by Conger, refers to curricula aimed at building students' abilities to perform the skills necessary to achieve their leadership goals.

Recent research has further explored the four strategies suggested by Conger by highlighting the specific curricular strategies used by leadership educators (Jenkins, 2012). In his assessment of pedagogical strategies employed within leadership education, Jenkins (2012) found that class discussions, interactive lectures, small group discussions, group projects and presentations, and research-project presentations were the most commonly used strategies. As we considered these common approaches within leadership education, we identified a lack of attention toward students' leadership knowing, especially through opportunities outside the traditional classroom. The experiential learning process holds the potential to engage students in learning through concrete activity (Kolb & Kolb, 2005), and may serve as a method for developing the knowing of leadership learners. In the following section, we explore the application of experiential learning within higher education.

Experiential Learning in Postsecondary Education

A common tendency among post-secondary educators is the attempt to transmit knowledge to the learner (Kolb & Kolb, 2005). This tendency emerges from the dominant metaphor within education, the acquisition metaphor, which views knowledge as a transferrable entity (Sfard, 1998). Alternatively, the participation metaphor suggests learning does not occur through transmission from one individual to another; rather, learning occurs when individuals engage in action, becoming participants within a community of practice (Sfard, 1998). The learning process described within the experiential learning theory forces educators to shift their perspective of learning from transmission of information to learning as a learner-centered process of action, reflection, reconceptualization, and application.

As we consider the transition of educators from acquisition-oriented teaching to experience-oriented teaching, we must highlight research on what constitutes an effective educational experience. First, it is important to note that not all experiences provide equal opportunity for learning (Dewey, 1938; Kolb & Kolb, 2005). Effective educational experiences create a learning space that appropriately balances challenges and support (Kegan, 1994; Sanford, 1966). Challenges emerge when students are pushed, through an experience, to participate in an environment which requires the adaptation of previously held ideas and behaviors to new environments (Evans, Forney, Guido, Patton, & Renn, 2009; Sanford, 1966). However, without adequate support, these challenging experiences can be detrimental to the learning process (Evans et al., 2009). This requires that post-secondary educators purposefully select experiences to initiate the experiential learning process (Kolb & Kolb, 2005). We designed our research to provide leadership educators with empirical data to make purposeful decisions regarding the use of community-based experiences in leadership education.

Methods

The purpose of our research was to explore students' reflections of a community-based leadership experience for evidence of progression through the experiential learning cycle. We selected qualitative research methods due to the exploratory nature of this research as well as the opportunity qualitative methodology affords researchers to share the personal stories and experiences of participants.

Data Collection

We collected data from all 11 students who participated in a community-based leadership experience within a year-long leadership development program. We collected the data through one-on-one, semi-structured interviews (Creswell, 2008) conducted a week after students completed the program and their community-based experience. Pre-determined questions were designed to have students reflect on their experiences within their community-based experience (e.g., "what benefits and challenges did you experience with your community involvement?"). The interviewer used follow-up questions to gather more information on the students' experiences. All data were transcribed verbatim in preparation for data analysis.

Participants

The 11 participants in this study ranged from sophomore to senior standing. Ten of the 11 students were enrolled in majors within the College of Agricultural Sciences with one student majoring within the College of Forestry. Throughout the description of our findings, we utilized pseudonyms to protect the identity of participants engaged in this research study. The participants were engaged in a leadership development program that included a community-based leadership development requirement. Students were expected to engage in a community-based experience for three to four hours a week during two (i.e. winter and spring terms) of the three terms they were enrolled in the leadership development program. Additional requirements of the program included being paired with a faculty mentor and participation in weekly seminars addressing a variety of leadership topics including personal leadership awareness, creating and sustaining change, and leaving a legacy through leadership.

Data Analysis and Analytical Framework

Data were deductively analyzed according to our operational model of the experiential learning process (Kolb, 1984). We developed five categories of codes based on our operational model: concrete experiences, reflective observations, abstract conceptualizations, pre active experimentation, and active experimentation. Table one describes the five codes and provides potential examples of the type of data that were coded within the five categories.

Table 1

Operational Codes used in Our Analysis

Code Category	Code Definition	Potential Quotes
Concrete Experience	Students completed a hands-on or minds-on experience.	"At my experience, I did…"
Reflective Observation	Students reflected on an experience.	"I noticed that during my experience…"
Abstract Conceptualization	Students created explanations for why their experience occurred a certain way.	"Because of my experience, I understand…better."
Pre active-experimentation	Students indicated a commitment to attempting a newly conceptualized strategy in future experiences.	"In the future, I will do…differently"
Active Experimentation	Students applied a new approach within their experience.	"I tried a different approach during my experience."

Note. Pre active-experimentation was added to our operational framework due to students expressing a commitment to future active experimentation without having the opportunity to complete that active experimentation at the point of data collection.

Using these operational codes, co-authors initially worked together to code two paragraphs of student data. This process was utilized to calibrate each individual coder to the operational codes. After the calibration phase, each of the four authors individually coded data for each of the students. Our individual coding process yielded 88% agreement among coders (Armstrong, Gosling, Martaeu, & Weinman, 1997); we believe this high level of agreement among coders evidenced a trustworthy coding process. Those codes on which the coders agreed are shared in this paper; additionally, we attempted to select data to share in the findings that were representative of the 11 students' experiences within their community-based leadership development activities.

Research Quality

In his comprehensive work on qualitative research, Creswell (2008) articulated a variety of strategies for ensuring high quality qualitative research; we employed a number of these strategies to increase the quality of our research process. First, our target throughout data collection was to collect "rich" data. We structured interviews to engage participants in an in-depth discussion in which students shared their experiences within their community-based leadership opportunities. Additionally, our four person research team sought to triangulate the data analysis process by each individually coding the data and then comparing our codes to ensure credibility of our analysis. Finally, we scanned the data for discrepant evidence (i.e. counter-codes), defined as data that would contradict our findings, to ensure the findings we report are an adequate representation of the experiences of students.

Limitations

The goal of qualitative research is to explore a phenomenon in-depth, often with fewer participants (Creswell, 2008; Maxwell, 2005). The nature of the qualitative approach often restricts the generalizability of findings to larger populations. Due to the limited number of participants and the unique nature of the program that participants were engaged in, we do not attempt to generalize the experiences of students in this study to larger populations. However, we feel the information we present in this study provides valuable information concerning the experiences in which students were involved. We encourage leadership educators to use the experiences of the participants in this study when considering the potential value of including or adapting a community-based experience within their leadership development offerings.

Findings

A summary of our findings, including the number of codes within each of the five categories (i.e. concrete experiences, reflective observations, abstract conceptualizations, pre active-experimentation, and active experimentation) for all participants, is provided in Table 2.

With the exception of Chris, each of the 11 students evidenced both a concrete experience and reflective observation through their community-based experiences. Considering the link between knowledge and knowing and the experiential learning process, these findings suggest 10 of the 11 students had opportunities to develop their knowledge (i.e. through reflective observations) *and* knowing (i.e. through concrete experiences) during their community-based leadership experiences. Additionally, nine of the 11 students provided evidence of an abstract conceptualization, another opportunity to develop their leadership knowledge, resulting from participating in their experiences. Three of the 11 students shared a commitment to applying a different approach in future leadership endeavors (i.e. pre active-experimentation; a representation of knowledge) and three students shared applying a new approach during their community-based experience (i.e. active experimentation; a representation of knowing). In an effort to share the students' stories, we broke the 11 participants into five groups based on their progress through the experiential learning cycle. For example, one group comprises Patty, Felix, and Jenna, because each were coded as engaging in concrete experiences, reflective observations, abstract conceptualizations, and pre active-experimentation; whereas Chris will comprise a group by himself, as he is the only participant to evidence reflective observation without any other categories. Grouping participants in this way provides the clearest representation of students' progressions through the experiential learning process.

Table 2

Summary of Codes by Experiential Learning Phase

	Number of Agreed Upon Instances for Codes				
Student	Concrete Experience	Reflective Observation	Abstract Conceptualization	Pre active-experimentation	Active Experimentation
Group 1					
Chris	-	3	-	-	-
Group 2					
Natasha	1	5	-	-	-
Group 3					
Marie	3	3	1	-	-
Charles	2	6	7	-	-
Karina	2	5	3	-	-
Group 4					
Felix	6	14	7	1	-
Jenna	4	3	2	2	-
Patty	2	7	2	1	-
Group 5					
Jaxson	3	7	7	-	1
Rita	1	6	1	-	1
David	2	5	3	-	1

Note. Concrete experience and active experimentation were considered representations of knowing; reflective observation, abstract conceptualization, and pre active-experimentation were considered representations of knowledge.

Group 1 – Chris

Group one comprises one participant, Chris. Chris, a sophomore majoring in agricultural sciences during his year in the leadership program, was one of the younger participants and the only student who evidenced just one stage of the experiential learning process: reflective observation. Chris's community-based leadership opportunity included volunteering at a local youth-sports organization where he engaged in developing sportsmanship among youth participants. As Chris described his experience within this organization, he kept the discussion focused at the level of reflection and did not evidence any other stages of the experiential learning process. For example, during his interview Chris reflected "I'd say the biggest benefit is just jumping into an organization and trying to meet people almost so fast to try to establish your credibility." During his interview, Chris shared a challenge he encountered during his experience; as part of his involvement, Chris was challenged to create a small change within the organization. Chris had an interest in changing a prominent chart that guided the youth to different sporting activities each day. However, the organization wanted Chris to work on developing the sportsmanship of the youth. Chris reflected that "it [was] hard to see or know the change because it is not on the wall; it is not where I can visually see it." Again, this quote stays at the reflection level, failing to address a different conceptualization of his experience or experimentation with different strategies during this challenge.

Group 2 – Natasha

The second group of participants also comprised one student, Natasha. Like Chris, Natasha was a sophomore during her experience. Majoring in Fisheries and Wildlife during her involvement in this leadership development program, Natasha volunteered with, and was a student board member for, an organization focused on wildlife preservation within the community. Throughout her interview, Natasha evidenced progression through two levels of the experiential learning process: concrete experience and reflective observation. Natasha entered into the leadership development program with no formal leadership experience; therefore, when discussing her involvement in the community, Natasha remarked "it was my first leadership experience." This quote evidenced a concrete experience, and was coded as such. Additionally, throughout Natasha's interview she reflected on her involvement, highlighting that it was "good to get connected with the community," and the value of "working with people who were a lot older than me." However, Natasha's comments remained at the reflection stage and never evidenced transitioning to abstract conceptualization.

Group 3 – Charles, Marie, and Karina

The third group of participants comprises three students: Charles, Marie, and Karina. These three students were placed within the third group because their interviews evidenced engagement in three of the experiential learning process stages: concrete experience, reflective observation, and abstract conceptualization. One member of this group, Charles, was a junior majoring in BioResource Research during his time in the leadership development program. Through his community-based experience, Charles volunteered at a community outreach clinic, a program designed to provide medical care to low-income families. Another member of group three, Marie, a senior majoring in Animal Sciences, volunteered for a local organization that pairs mentors with younger girls who build relationships through running. The final member of group three, Karina, a sophomore also majoring in Animal Sciences while in the leadership development program, volunteered her time at a local soup kitchen. While each of these three students had a unique experience, our discussion will focus on Karina, whose reflections best represent the experiential learning process evidenced by the members of this group.

During her interview, Karina shared that volunteering at the soup kitchen was a "very new experience for me," a comment that evidenced a concrete experience. Additionally, Karina demonstrated reflective observation when she reflected on the value of encouraging students to get off campus for an experience, sharing "I thought it was great to make sure [we are] going outside the college…we tend to stick to what we know.” Additionally, Karina said, “I have never volunteered in a soup kitchen before; I didn’t really know what to expect, and I had a lot of really great experiences and interactions with people while I was there.” Evidence of a transition to abstract conceptualization, defined as new ways of thinking about their engagement in their community-based leadership opportunities, distinguishes members of this group from groups one and two. For Karina, this was identified in the following quote, “if I had cleared a little more time in my schedule and known what I going to get out of [my experience], that would have been beneficial.” In Karina’s example, we see her transitioning from simply reflecting on her experience to describing a new way of conceptualizing her actions. We coded this transition as evidence that Karina moved to the third stage of the experiential learning process, abstract conceptualization.

Group 4 – Felix, Jenna, and Patty

The fourth group of participants included three individuals, Felix, Jenna, and Patty. Students included in this group evidenced four stages of our operational framework for the experiential learning process: concrete experience, reflective observation, abstract conceptualization, and pre active-experimentation. The three students categorized into this group included Felix, a sophomore majoring in BioResource Research during his time in the leadership development program. Felix’s community-based leadership experience involved volunteering at a nursing home for senior citizens. Another member of group four, Jenna, a junior majoring in Agricultural Business Management, tutored high school students. The third member of group four, Patty, was a sophomore majoring in Agricultural Sciences and Spanish during her time in the leadership development program. For her community-based leadership experience, Patty volunteered at a local elementary school, assisting younger students in their academics. For our discussion, we will again focus on one student, Felix, and his experiences as a representation of the shared progress of students within this group through the experiential learning process.

Felix shared a number of concrete experiences that occurred during his community-based leadership experience of volunteering in a nursing home. Specifically, Felix shared the experience of “meeting the same people every single time I went there, because they didn’t remember me.” In addition to concrete experiences, Felix’s interview evidenced a number of reflective observations occurring during his community-based leadership opportunity. Felix reflected, “I really enjoyed [my experience]. I felt like I was doing something benefitting both me and the residents;” another reflective observation came when discussing a struggle to “go through all the applications” necessary to volunteer at the nursing home. Through his interview, Felix also evidenced abstract conceptualizations arising throughout his involvement with the nursing home. For example, Felix identified an alternative way of approaching community involvement, “I would start looking a lot earlier and take it a lot more seriously.” Felix also identified a new conceptualization for community service. When discussing the impact of his community-based leadership opportunity, he shared “it kind of helps you realize what you want to do, what you really want to do, the things that aren’t really going to help you and the things that you really feel are valuable.”

In addition to evidencing concrete experiences, reflective observations, and abstract conceptualizations, participants in this group shared a commitment to engaging differently in future experiences, which we operationalized as pre active-experimentation. While we acknowledge this commitment may not translate into active experimentation, we feel a commitment to approaching a situation differently shows progression through the experiential learning process beyond abstract conceptualization. Within Felix's interview, he shared the challenges he faced going through the application process to volunteer at the nursing home. Felix then went on to share, "if I was to go back and try to continue volunteering there throughout the summer or into next year, I would definitely mention something [about the application process], like maybe help take over the website or do something to help along the volunteer process." In this quote, we see Felix transitioning from an abstract conceptualization to thinking about how he could apply this abstract conceptualization within his community-based leadership experience. This transition was also evident for the other two participants within group four. During Jenna's interview, she shared a commitment to planning for community involvement in the future, "maybe it's not so much that I get involved with five things like I have done in the past, but cut it down to see if I can do that and hopefully community involvement will be one of those next year." Patty also shared a commitment to involvement, stating she needs to do a "better job researching my options." The transition evident in these comments is a commitment to a changed behavior in future endeavors, which distinguished group four from the other groups.

Group 5 – Jaxson, Rita, and David

The final group of participants includes three students, Jaxson, Rita, and David. Students in this group were unique in that they evidenced each of the four original stages of the experiential learning cycle: concrete experience, reflective observation, abstract conceptualization, and active experimentation. The three students within this group included Jaxson, who was a junior majoring in Agricultural Sciences and whose community-based leadership experience involved advocating for agriculture within the state legislature. Group five also included Rita, a senior majoring in Agricultural Sciences. Rita's community-based leadership experience involved a community food bank designed as a food resource for low-income families. The third member of group five, David, was also a senior majoring in Environmental Economics and Policy during his time in the leadership development program. David's community-based leadership experience entailed volunteering his time in a state senator's office. For our group-five discussion, we will focus our analysis on David, as we feel his reflections accurately represent this group's progression through the experiential learning process.

David evidenced engaging in concrete experiences during his community-based leadership experience. Specifically, David shared "meeting a lot of people and building relationships." Additionally, David evidenced reflective observations throughout his time working within the senator's office. One of these reflective observations was identified when David shared a challenge he had working within the office to, "[make] my actions relevant to community members…I couldn't see a direct impact on what I was doing." Through David's interview, evidence also emerged of abstract conceptualizations occurring through his involvement; specifically, David mentioned learning to change his expectations when working with others. He said, “it’s hard to push people because, you know, they don’t have the time or they just don’t really want to do it, so it’s really hard to push people to get the results that you want, so sometimes you need to settle for a little bit less.” The defining characteristic for group five was that participants evidenced transitioning their abstract conceptualizations to active experimentation within their experience. In David’s interview, he discussed the “direct correlation between the things I was learning in the [seminar portion of the leadership development experience] and reflecting on my past experiences and then applying them to this new experience.” David was not alone in his active experimentation, Jaxson also shared that he had to “improvise to fix things” when overcoming challenges within his experience. Rita also shared that her awareness of body language pushed her to actively experiment with new actions at the food bank, “each time I went I had to be actively aware of my body expressions and the way I talked.” These data illustrate that students within group five had the opportunity to actively experiment with new ideas, skills, and approaches through their involvement in community-based leadership.

Discussion

In this paper, we argue for a leadership education approach that attends to both knowledge *and* knowing, based on the necessity of post-industrial leaders to possess knowledge of leadership approaches as well as the knowing (i.e. practice) required to enact these approaches in different environments. We identified that common pedagogical practices in leadership education may not develop students’ knowledge *and* knowing (Allen & Hartman, 2009; Jenkins, 2012) and proposed community-based leadership experiences as a method for doing so. Using the experiential learning process (Kolb, 1984) as a theoretical foundation, we sought to test the efficacy of community-based leadership experiences by exploring students’ reflections after a community-based leadership experience for evidence of progression through the stages of the experiential learning process.

Through analysis of students’ interviews, we determined that three of the 11 students provided evidence of progression through the four original stages of the experiential learning process: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Additionally, three students shared evidence of progressing through concrete experience, reflective observation, abstract conceptualization, and pre active-experimentation. While we acknowledge pre active-experimentation does not complete the experiential learning process, we suggest a student’s commitment to attempting new approaches in future endeavors is a positive outcome of a community-based leadership experience. However, this still leaves five of the 11 students who did not reach the active experimentation or pre active-experimentation stage of the experiential learning process. When considering the experiences of these five students, we must first note that failure to evidence progression through the experiential learning process during an interview does not definitively imply that none of these students moved beyond the stages they articulated. It is possible students progressed through additional stages of the experiential learning process but did not share evidence of this during their interviews. Furthermore, we must consider whether the lack of evidence that these five students moved beyond abstract conceptualization constitutes a failed experience. We contend that any experience that engages students in components of the experiential learning process has value;

therefore, the experiences of students who did not complete the experiential learning process should not be declared a complete failure. However, we should still consider potential reasons why students' reflections did not provide evidence of transition through the experiential learning process, especially as we consider the need to develop students' knowledge and knowing.

We identified the experiential learning process as a viable framework for analyzing the development of knowledge and knowing, because the experiential learning process yields evidence of both knowledge (i.e., engagement in reflective observations and abstract conceptualizations) and knowing (i.e., engagement in concrete experiences and active experimentations). From this perspective, we concluded that 10 of the 11 students identified an experience linked to building both knowledge and knowing within their community-based leadership experiences. The one exception was Chris, who did not evidence the development of knowing (i.e., no codes for either concrete experience or abstract conceptualization). These findings provide convincing support for community-based leadership experiences as a viable tool to engage leadership learners in developing both knowledge and knowing.

Additionally, as we compare the reflections of students who progressed through one or two stages of the experiential learning process (i.e., Chris and Natasha) to those students who progressed through the four traditional stages of the experiential learning process (i.e. Jaxson, Rita, and David), one important distinction emerges. Chris and Natasha were both younger students with little to no formal leadership experience prior to this opportunity; whereas, Jaxson, Rita, and David all had senior or junior standing and had participated in formal leadership endeavors before engaging in this community-based leadership development experience. Potentially, those less-experienced students may have been trying to orient themselves to community-based leadership and did not gain the support level necessary to balance the challenges of a new experience (Kegan, 1994; Sanford, 1966). We encourage future research exploring the role of previous leadership experience on student progression through the experiential learning process in leadership education.

Conclusions, Implications, and Recommendations

Research in leadership education must consider the effectiveness of various leadership development approaches. This line of inquiry provides leadership educators with empirical data useful in making curricular decisions within their leadership development programs. Our study found community-based leadership experiences effectively engaged all students in at least one aspect of the experiential learning process; however, evidence also emerged that student characteristics (i.e. experience in leadership settings) may influence a student's experience and his/her progression through the experiential learning process. We encourage leadership educators who utilize community-based leadership experiences, or who are considering this approach, to differentiate their support for students based on the student's previous leadership experience. For example, a student with little to no leadership experience should be given more support during a community-based leadership experience when compared to a student with previous leadership experience. Research identifying the importance of balancing challenges and support to create an appropriate learning space for students supports this recommendation (Kegan, 1994; Sanford, 1966). It is important for leadership educators to adapt and differentiate their leadership development approaches to create an appropriate learning space for all students engaged in leadership development.

We also recommend all leadership educators consider if, and how, the approaches they utilize attend to both knowledge *and* knowing. Effective leadership in the post-industrial era requires both knowledge and knowing. As leadership educators, we are doing leadership learners a disservice by attending to only one of these outcomes within our programs. Our research provided evidence that 10 out of the 11 participants were engaged in opportunities to increase their knowledge and knowing during a community-based leadership experience. While these findings are encouraging, we recommend continued research on additional leadership development approaches and their abilities to engage and develop students in both knowledge and knowing.

Leadership development is a critical endeavor because it empowers individuals to make a positive difference in the lives of others. Leadership educators, and the leadership development experiences they employ, hold tremendous capacity to influence current and future change agents. Research and experience should inform the curricular decisions made by leadership educators. In this study, we explored one potential leadership development approach, community-based leadership experiences, and revealed important considerations when applying this approach to leadership development. Our hope is that leadership educators use this information to make an informed decision about the application of this approach within their leadership development programming.

References

Allen, S. J., & Hartman, N. S. (2009). Sources of learning in student leadership development programming. *Journal of Leadership Studies, 3*(3), 6-16. doi: 10.1002/jls.20119.

Armstrong, D., Gosling, A., Weinman, J., & Marteau, T. (1997). The place for inter-rater reliability in qualitative research: An empirical study. *Sociology, 31*(3), 597-606.

Astin, A. W., & Astin, H. S. (2000). *Leadership reconsidered: Engaging higher education in social change*. Battle Creek, MI: W. K. Kellogg Foundation.

Brungardt, C. (1996). The making of leaders: A review of the research in leadership development and education. *Journal of Leadership & Organizational Studies, 3*(3), 81-95.

Conger, J. (1992). *Learning to lead: The art of transforming managers into leaders.* San Francisco, CA: Jossey-Bass.

Cook, S. D. N, & Brown, J. S. (1999). The generative dance between organizational knowledge and organizational knowing. *Organizational Science, 10*(4), 381-400.

Creswell, J. W. (2008). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications, Incorporated.

Dewey, J. (1938). *Education and experience.* New York, NY: Simon and Schuster.

Evans, N. J., Forney, D. S., Guido, F. M., Patton, L. D., & Renn, K. A. (2009). *Student development in college: Theory, research, and practice.* San Francisco, CA: Jossey-Bass.

Jenkins, D. M. (2012). Exploring signature pedagogies in undergraduate leadership education. *Journal of Leadership Education, 11*(1), 1-27.

Kegan, R. (1994). *In over our heads: The mental demands of modern life.* Cambridge, MA: Harvard University Press.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, N.J.: Prentice-Hall.

Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education*, *4*(2), 193-212.

Maxwell, J. A. (2005). *Qualitative research design: An interactive approach* (2nd ed.). Newbury Park, CA: Sage Publications, Incorporated.

Rost, J. C., Barker, R. A. (2000). Leadership education in colleges: Toward a 21st century paradigm. *The Journal of Leadership Studies, 7*(1), 3-12.

Sanford, N. (1966). *Self and society: Social change and individual development*. New York City NY: Atherton Press.

Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one. *Educational Researcher*, *27*(2), 4-13.

Zimmerman-Oster, K., & Burkhardt, J. C. (1999). *Leadership in the making: Impact and insights from leadership development programs in U.S. colleges and universities.* Battle Creek, MI: W. K. Kellogg Foundation.

Describing the Coaching Behaviors of Agricultural Education Coaches for the National FFA Parliamentary Procedure Career Development Event

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Abstract

Career Development Events (CDEs) provide opportunities for students to develop personal and agricultural skills. Just like athletics, a coach is required to facilitate the learning that occurs during the events. The purpose of this study was to describe the coaching behaviors of the 41 coaches of the 2013 Parliamentary Procedure CDE. Survey research methods were used to gather self-perceived coaching behaviors and coach/team demographics. Coaches most often exhibited positive feedback behavior and exhibited autocratic behavior least often. Moderate associations were found between the hours practiced as a team and the situational consideration, social support and training and instruction behaviors, suggesting that coaches use this time to enhance the skills of students. Very low relationships were found between the overall coaching score and years of teaching or coaching experience, suggesting that both novice and veteran teachers can be successful coaches. The researchers recommend that professional development be offered to agriculture teachers encouraging them to coach teams that are part of the curriculum and are interesting to students, regardless of the currently knowledge level of the teacher. Future research should address whether or not other CDE coaches in other events exhibit similar behaviors.

Introduction and Review of Literature

In agricultural education, Career Development Events (CDEs) are a way for students to compete in a culminating event that tests the knowledge, preparation, and skills of an individual or team. In many cases, CDEs are like athletic games because both events require preparation and a dedicated coach to guide the individuals through the learning process. It is the coach who ensures that there is a continued focus on providing students with valuable skills needed to be successful in the future.

The characteristics of youth competitive events both in athletics or education can be motiving to students (Tauer & Harackiewicz, 2004; Vansteenkiste & Deci, 2003). Tauer and Harachiewicz (2004) conducted a meta-analysis on cooperative and competitive activities for adolescents. When both cooperation and competition were combined, individuals enjoyed an activity more than pure competition and pure cooperation (Tauer & Harackiewicz, 2004). Similarly, Vansteenkiste and Deci (2003) conducted an experimental study of 80 university students to describe the effects of competition on student motivation. The researchers found that competition is a positive, effective motivator for students, however, this was only true when coupled with effective coaching and feedback behaviors. Effective coaching and positive feedback behaviors were also important for the losers of events, which could be a key factor in maintaining student motivation when a student does not experience success (Vansteenkiste & Deci, 2003).

Coaching behavior research in both athletics and agricultural education were reviewed to inform the current study since the behavior of the coach plays such a key role in the motivation of the individuals involved. Researchers in athletics have identified key coaching practices that affect the development of skills and performance of athletes (Becker & Wrisberg, 2008; Bloom, Crumpton, & Anderson, 1999; Markland & Martinek, 1998). Becker and Wrisberg (2008) conducted a qualitative study of basketball coach Pat Summitt in an attempt to describe the coaching behaviors that led to her success. The researchers observed practices and identified key behaviors she exhibited. The data analysis revealed that Summitt provided instruction more than any other behavior during practices. Positive feedback was also a key component to her coaching because it allowed Summitt to encourage players when needed (Wrisberg, 1990).

Bloom, Crumpton, and Anderson (1999) conducted a qualitative study on the coaching behaviors of Jerry Tarkanian, veteran basketball coach at Fresno State University. Similar to Pat Summitt, Tarkanian exhibited tactical training behaviors more than any other type during practice. Tactical training behaviors focus on building basics skills that are needed for more advanced skill development. Bloom et al. (1999) suggested that Tarkanian exhibited tactical training behaviors approximately one third of the time because these skills were needed so players could build on them to reach an elite level of competition.

Markland and Martinek (1998) shifted their focus away from college age students and aimed to describe the coaching behaviors of four North Carolina high school volleyball coaches. The researchers concluded that successful coaches provided more feedback to players than less successful coaches. Markland and Martinek (1998) speculate that the disparity in player feedback could be influenced by the coach's perception on how much training and instruction a player can handle.

The research in agricultural education does lay the foundation on coaching behaviors that CDE coaches exhibit when training teams (Bowling, 2010; Voigt, Talbert, McKinley, & Brady, 2013). According to the National FFA Organization (2012), CDEs seek to, "develop individual responsibilities, foster teamwork and promote communication while recognizing the value of ethical competition and individual achievement" (p. ii). Because of the interrelationship between classroom/laboratory instruction and FFA, the preparation and coaching that occurs are often facilitated by the high school agriculture educator(s). There are examples however, where an outside partner of the agriculture program volunteers their time to serve as a coach to prepare the team for the final event (Tillinghast, Ramsey, & Terry, 2013).

Voigt, Talbert, McKinley, and Brady (2013) conducted a qualitative study to begin identifying promising coaching practices of Indiana dairy, horse, and livestock evaluation coaches. Thirteen coaches that had at least two teams place in the top three between 2005 and 2010 were included in the study. Phone interviews and focus groups were then used to begin developing a consensus on coaching best practices (Voigt et al., 2013). Eight central tendencies, or key themes, were identified. Each theme emerged from the ideas and thoughts of coaches on the best practices that coaches should display. The eight central tendencies were as follows:

1. Expectations - Both the goal and team must establish expectations for their success.
2. Effective - Coaches are motivated to succeed because of their passion for student learning.
3. Experience - Prior coaching experience, whether it be through first hand experience, mentoring, or advising relationships with other coaches, is essential to success.
4. Goals – Setting team and individual goals motives youth to strive for success.
5. Support – Coaches should know the personality of the students and have support from others.
6. Foundational Knowledge – Team mentoring can be a way to teach content associated with the event.
7. Positive Environment – Positive reinforcement and adaptability should occur in youth coaching experiences.
8. Youth Development – A student can develop personal and life skills for participating in a CDE (Voigt et al., 2013).

Voigt et al. (2013) had three recommendations based on the results of their qualitative themes. The first was that structured opportunities to train coaches should be developed. Also, resources need to be made available for novice or inexperienced coaches to use as they train teams. The final recommendation was that further research expands on the results of the study to identify additional best practices, as well as their effects on the student members (Voigt et al., 2013).

Bowling (2010) conducted a study that focused on describing 51 Missouri FFA Floriculture CDE coaches. John Wooden's Pyramid of Success served as the theoretical base of the study and the data collection. According to Bowling (2010), coaches exhibited reflective and motivation behaviors most often, which include the friendship, confidence, enthusiasm, team spirit, and cooperation areas of Wooden's Pyramid of Success. The researcher recommended that research regarding CDE coaching behaviors should be conducted to describe behaviors specific to each CDE (Bowling, 2010).

The competitive nature of CDEs can be motivating to students if the correct coaching behaviors are exhibited (Tauer & Harackiewicz, 2004; Vansteenkiste & Deci, 2003). Even though studies in athletics and agricultural education offer suggestions on which coaching behaviors are most effective, both of the recent studies in agricultural education call for further research into specific settings (Bowling, 2010; Voigt et al., 2013). In addition, studies by Garton and Chung (1996), Layfield and Dobbins (2002), and Harris (2008) suggest that CDE event coaching and preparation are desired areas of teacher professional development.

Priority 3: Sufficient Scientific and Professional Workforce that Addresses the Challenges of the 21st Century of the American Association for Agricultural Education's National Research Agenda for 2011-2015 calls for future research in, "developing the models, strategies, and tactics that best prepare, promote and retain new professionals who demonstrate content knowledge, technical competence, moral boundaries, and cultural awareness couple with communication and interpersonal skills" (Doerfort, 2011, p. 9). Previous studies call for further investigation into CDE coaching research and ways to develop preservice and teacher competencies in coaching (Layfield & Dobbins, 2002; Garton & Chung, 1996; Harris, 2008; Bowling, 2010; Voigt et al., 2013). The results of this study may inform teacher education programs and professional develop to assist in developing new models for CDE coaching.

Theoretical Foundation

Hertzberg's Motivation-Hygiene Theory served as the theoretical foundation for this research study. The theory espouses that individuals entering the workforce need hygiene factors and human needs. The hygiene factors, or the environment, include supervision, interpersonal relations, adequate working conditions, and a payment. The human needs, or motivators, include recognition, work, responsibility, and advancement (Accel-Team, 2013).

Based upon Hertzberg's Motivation-Hygiene Theory, the diverse opportunities offered through FFA help students develop a high degree of self-efficacy (Phipps, Osborne, Dyer, & Ball, 2008, p. 406). According to Phipps, Osborne, Dyer, and Ball (2008), the theory specifies "that motivation (the level of achievement one attains, the amount of recognition received, growth/advancement, and interest in the project) and hygiene (the environment in which one performs) contribute greatly to an individual's level of self-efficacy or self-esteem" (Phipps et al., 2008, p. 406).

The coach of a Career Development Event (CDE) plays a role in both the motivation and hygiene aspects of the theory. The coach can increase motivation by providing material rewards or by providing verbal praises or other non-material positive feedback. Also, the coaching behaviors exhibited will establish the environment in which the team prepares and competes. The aim of this research study was to gather information on the coaching behaviors of CDE coaches to better prepare future and current agriculture teachers.

Purpose and Research Objectives

The purpose of this study was to describe the coaching behaviors of the National FFA Parliamentary Procedure Career Development Event and their relationship to coach and team demographics. The following three objectives guided the study:

1. Describe the characteristics of the national qualifying parliamentary procedure CDE coaches and teams.
2. Identify the frequency of self-perceived coaching behaviors of the national qualifying parliamentary procedure CDE coaches.
3. Describe the relationship between six coaching behavior constructs and the characteristics of the coach and team

The parliamentary procedure CDE was chosen for this study because it is a team event that involves a six-member team. Each member must work collaboratively toward a common goal during a meeting, which often requires preparation prior to the national event. Anecdotally, the involvement by a coach in this event is necessary to ensure that students are gaining the skills and knowledge needed to be successful.

Methods

The population of this study was the primary coach of each of the 41 parliamentary procedure Career Development Event (CDE) teams that competed in the 2013 National FFA Convention and Expo. If a team had more than one coach, only the lead coach was asked to participate in the study. A census of all national qualifying parliamentary procedure coaches was conducted because the desired population was a manageable size and all coach perspectives were desired. To be eligible to compete at the national level, teams had to qualify by winning their state event or be certified by their state FFA Association.

The questionnaire used for the study was adapted from the Revised Leadership Scale for Sport (Zhang, Jensen, & Mann, 1997). The RLSS was originally used to measure coaching behaviors in an athletic setting. Six different coaching behavior constructs were included in the RLSS. The six constructs are autocratic, democratic, positive feedback, situational consideration, social support, and teaching and instruction. The wording in the questionnaire was adapted to meet the objectives of this study.

A panel of experts was used to establish face and content validity of the questionnaire. The panel was composed of three agricultural education professors from two different universities, as well as a university-level athletic director. Three cognitive interviews were also conducted with high school agricultural educators with experience in the parliamentary procedure CDE. To conduct the interviews, the high school educator completed the questionnaire in the presence of the researchers. According to Dillman, Smyth, and Christian (2009), cognitive interviews help determine how the participants interpret the questions and whether the intent for each item was realized (p. 221). The questionnaire was composed of the six coaching behavior constructs and questions pertaining to team and coach demographics.

Each of the six constructs were made up of 8-9 statements. A five-point summated rating scale was used to measure the frequency of coaching behaviors, as self-reported by the coach. The frequency scale used was 1-Never (0%), 2-Seldom (25%), 3-Occasionally (50%), 4-Often (75%), and 5-Always (100%). Following the constructs, there were questions used to describe characteristics of the coach. Questions included years of coaching experience, years of teaching experience, and the amount of time spent preparing a team for the event.

A pilot study was conducted during the state parliamentary procedure CDE in the home state of the researchers. Cronbach's alpha reliability coefficients were calculated for each construct, yielding a range from .60 to .79. The Cronbach's alpha reliability coefficients for all six constructs exceeded .60, which is the acceptable minimum for exploratory research (Ary, Jacobs, Razavieh, & Sorensen, 2006; Hair, Black, Babin, Anderson, & Tatham, 2006). Minor changes were made to several construct items to increase the reliability of the data from the study.

Data collection followed survey research methods. The study received exemption from the University of [State] Institutional Review Board (IRB) project number 13-037 prior to data collection. Upon exemption, a directory of all 41 coaches of the National FFA Parliamentary Procedure CDE was obtained from the event superintendent. Approximately a week prior to the event, participants were sent an email notifying them of the upcoming study, the procedures, and the potential benefits of their participation.

Data collection occurred during the 2013 National FFA Convention and Expo. As the coaches were waiting for their teams to complete the exam portion of the event, all the coaches were provided the questionnaire and a place to complete it. A "convention care package" that included items useful for an FFA advisor during convention was also given as an incentive for participating.

The data were compiled, coded, and analyzed using the Statistical Package for the Social Sciences (SPSS) v.21. Post hoc reliabilities for each construct were calculated. Nominal and Likert scale data were also analyzed to address the outlined research objectives. An overall coaching behavior score was calculated by adding the six coaching behavior mean scores for each coach together. Davis (1971) was referenced for the descriptions used to identify the magnitude of the Pearson correlation between coaching behaviors and demographics.

Results

A completed questionnaire was collected from each of the 41 participants, resulting in a 100% response rate. Cronbach's alpha post hoc reliability coefficients were calculated to ensure the reliability of the data. As summarized in Table 1, the post hoc reliability coefficients exceed the acceptable level of .60 (Ary et al., 2006; Hair et al., 2006).

Table 1

Post hoc Cronbach's alpha Reliability Coefficients

Construct	Number of Items	Coefficient
Autocratic Behavior	8	.65
Democratic Behavior	9	.81
Positive Feedback Behavior	8	.72
Situational Consideration Behavior	8	.74
Social Support Behavior	9	.78
Training and Instruction Behavior	9	.76

Objective One- Coach and Team Demographics

The first objective was to describe characteristics of the coach and team. Of the 41 coaches, 12 were female and 29 were male. Thirty-nine of the coaches reported being the agricultural instructor at the school and two were volunteer coaches. Participants were also asked to identify the number of coaches involved in the team training. Twenty-seven coaches reported being the only coach of the team. Eleven reported having two coaches, and three participants indicated that three coaches were involved.

The coaches who were agriculture teachers (*n* = 39) had between one and 33 years of teaching experience, with a mean of 17.4 years (*SD* = 10.1). All respondents were asked about their previous coaching experience. Respondents had an average of 13.5 years (*SD* = 10.2) experience coaching the parliamentary procedure CDE for any level and an average of 3.2 years (*SD* = 3.4) experience coaching for national-level competition.

Twenty-seven of the 41 respondents reported participating in the parliamentary procedure CDE as a student member, 23 of which reported competing at the state level and six at the national level as a student. Coaches that were involved in the CDE as a student were also asked to indicate if they felt they coached the same as their coach did when they were a student. Two reported ‘Yes’, 19 responded ‘No’, and nine indicated that they ‘Sometimes’ coach like they were previously coached.

Additionally, respondents were asked how they were compensated for their time coaching the parliamentary procedure CDE. Sixteen coaches indicated they received no compensation while the remaining 25 answered that they did receive some form of compensation. This compensation took the form of a coaching stipend (*n* = 6), a teacher’s extended contract (*n* = 16), an FFA stipend (*n* = 8), or a combination of multiple compensation methods.

Coaches were asked about their perceptions on their own coaching. One item asked how effective they perceived themselves as a coach that year. A scale ranging from 1-Not Effective to 10-Extremely effective was used to describe this perception. The mean result was a self-rating of 7.39 (*SD* = 1.1). A second item identified the focus of the coach. A scale ranging from 1-Skill Improvement to 10-Winning the Event was used to describe the coach’s focus. The mean of the coaches’ responses was 5.75 (*SD* = 2.0).

Team characteristics were also described. Teams practiced 3 days a week, which was the median response (*M* = 2.8, *SD* = 1.3). Teams practiced an average of 20.4 weeks (*SD* = 13.2) in preparation for the national event. Each week, the members spent an average of 4.6 hours (*SD* = 2.7) practicing as a team, and an additional 4.0 hours (*SD* = 3.3) individually practicing for the event. Twenty coaches reported having practiced before school, 12 indicated practice was held during class, eight practiced during lunch, four reported practicing during special periods of the day, 31 responded as having practiced after school, and 17 teams practiced on the weekends. Coaches had the option to select multiple practice times.

Objective Two- Coaching Behaviors

The second objective of this study was to identify the coaching behaviors of each of the 41 parliamentary procedure CDE coaches. The coaching behaviors exhibited most often by the participants of this study are found in Table 2. The data summarized are the mean construct scores of the participant for each of the coaching behavior constructs. Positive feedback was most often exhibited (*M* = 4.5, *SD* = .38) and autocratic behavior (*M* = 2.58, *SD* = .54) was exhibited least often.

Table 2

Coaching Behaviors of National-Qualifying Parliamentary Procedure Coaches (N = 41)

Behavior	*M*[a]	*SD*
Positive Feedback	4.52	.38
Social Support	4.41	.45
Training and Instruction	4.28	.47
Situational Consideration	4.14	.50
Democratic	3.74	.55
Autocratic	2.57	.54

Note. [a]The behaviors were measured on the following Likert-scale: 1-Never (0%), 2-Seldom (25%), 3-Occasionally (50%), 4-Often (75%), and 5-Always (100%).

An overall coaching behavior score was also analyzed to identify how frequent coaches displayed any type of coaching behavior. This overall coaching score was calculated by adding the six coaching construct means together into one composite score. The mean overall coaching score was 23.68 (SD = 1.51).

The relationships between each of the six coaching behaviors were also analyzed. The Pearson correlation coefficients between the coaching behavior constructs are summarized in Table 3.

Table 3
Pearson Correlation between Coaching Behaviors (N = 41)

	Autocratic	Democratic	Positive Feedback	Situational Consideration	Social Support	Training and Instruction
Autocratic	1	.	.	.	.	.
Democratic	**-.45 (.19)***	1	.	.	.	.
Positive Feedback	**-.35 (.12)***	**.37 (.13)***	1	.	.	.
Situational Consideration	.01 (.00)	.13 (.01)	**.48 (.23)***	1	.	.
Social Support	-.13 (.01)	-.06 (.00)	**.48 (.23)***	**.46 (.21)***	1	.
Training and Instruction	-.17 (.020	-.13 (.02)	**.51 (.26)***	**.60 (.36)***	**.65 (43)***	1

Note. An (*) indicates a significant value of $p < .05$; Pearson correlation are listed first, followed by the coefficients of determination in parentheses.

A moderate, negative relationship existed between the autocratic and democratic coaching behaviors (r (39) = -.45, p < .05, r^2 = .19). The positive feedback construct had significant relationships between the other five constructs. A moderate, negative relationship existed between positive feedback and the autocratic construct (r (39) = -.35, p < .05, r^2 = .12). Moderate, positive correlations also existed between positive feedback and the democratic construct (r (39) = .37, p < .05, r^2 = .13), situational consideration (r (39) = .48, p < .05, r^2 = .23), and social support (r (39) = .48, p < .05, r^2 = .23). A substantial, positive relationship existed between positive feedback and the training and instruction construct (r (39) = .51, p < .05, r^2 = .26).

Situation consideration had a significant, moderate, positive relationship with the social support construct (r (39) = .46, p < .05, r^2 = .21) and a significant, substantial relationship with the training and instruction construct (r (39) = .60, p < .05, r^2 = .36). Lastly, a substantial, positive relationship existed between the training and instruction and the social support (r (39) = .65, p < .05, r^2 = .43) constructs.

Objective Three- Relationship Between Coaching Behaviors and Demographics
The Pearson correlation coefficients between the team and coach characteristics and the six coaching behavior constructs are summarized in Table 4. Coach characteristics included years of teaching experience, years as a coach a of parliamentary procedure CDE at any level as well as at the national level, the coach's goal of the event, and how effective they felt they were at coaching the team. Team characteristics include the amount of hours spent preparing for the event each week individually and then as a team, the number of practices held each week, and the number of weeks spent preparing for the national event.

Table 4
Relationships between Coach/Team Demographics and Coaching Behaviors (N = 41)

	Autocratic	Democratic	Positive Feedback	Situational Consideration	Social Support	Training and Instruction
Years of Teaching Experience	**.32 (.10)***	-.22 (.05)	-.10 (.01)	-.07 (.00)	-.06 (.00)	.05 (.00)
Years of Parliamentary Procedure Coaching (National Level)	.04 (.00)	-.17 (.03)	.03 (.00)	-.07 (.00)	-.10 (.01)	.04 (.00)
Years of Parliamentary Procedure Coaching (Any Level)	**.36 (.13)***	**-.33 (.11)***	-.19 (.04)	-.16 (.03)	-.19 (.04)	-.02 (.00)

Hours of Practice per Week (Individual)	.21 (.04)	.23 (.05)	.31 (.09)	**.37 (.13)***	**.40 (.16)***	.29 (.08)
Hours of Practice per Week (Team)	-.17 (.03)	.13 (.01)	.30 (.09)	**.31 (.09)***	**.39 (.15)***	**.42 (.17)***
Total Weeks Practiced	.12 (.01)	.12 (.01)	.28 (.07)	.29 (.08)	.29 (.08)	.20 (.04)
Number of Practices per Week	-.01 (.00)	-.03 (.00)	-.05 (.00)	.18 (.03)	.15 (.02)	.27 (.07)

Note. An (*) indicates a significant value of $p < .05$; Pearson correlation are listed first, followed by the coefficients of determination in parentheses.

A moderate, positive relationship was found between the autocratic coaching behavior both the years of teaching experience (r (39) = .32, $p < .05$, $r^2 = .10$) and the number of years coaching the parliamentary procedure CDE at any level (r (39) = .36, $p < .05$, $r^2 = 13$). In contrast, a moderate negative relationship was found between the democratic coaching behavior and the years coaching of parliamentary procedure CDE coaching experience at any level (r (39) = -.33, $p < .05$, $r^2 = .11$).

Two moderate, positive relationships existed between coaching constructs and the hours practiced per week as an individual. These were the situational consideration coaching construct (r (39) = .37, $p < .05$, $r^2 = .13$) and the social support construct (r (39) = .40, $p < .05$, $r^2 = .16$).

Three moderate, positive relationships existed between the coaching constructs and the number of hours spent practicing as a team characteristic. The situational consideration construct (r (39) = .31, $p < .05$, $r^2 = .09$), the social support coaching construct (r (39) = .39, $p < .05$, $r^2 = .15$), and the training and instruction construct (r (39) = .42, $p < .05$, $r^2 = .17$) all had significant relationships with the hours practiced as a team.

Pearson correlation coefficients were also calculated to determine the relationships between the six coaching behaviors and the coaching perceptions. As summarized in Table 5, a moderate, positive relationship existed between the autocratic coaching behavior and the goal of winning the event (r (39) = .37, $p < .05$, $r^2 = .13$). A moderate, positive relationship also existed between the situational consideration coaching behavior and reported being effective as a coach (r (39) = .44, $p < .05$, $r^2 = .19$).

Table 5

Relationships between Coach Perceptions and Coaching Behaviors (N = 41)

	Autocratic	Democratic	Positive Feedback	Situational Consideration	Social Support	Training and Instruction
Focus on Winning or Skill Improvement	**.37 (.13)***	-.11 (.01)	-.17 (.02)	.17 (.02)	-.13 (.01)	-.02 (.00)
Effectiveness As a Coach	.24 (.05)	.07 (.00)	.05 (.00)	**.44 (.19)***	.06 (.00)	.01 (.00)

Note. An (*) indicates a significant value of $p < .05$; Pearson correlation are listed first, followed by the coefficients of determination in parentheses.

In the final data analysis step of the study, Pearson correlation coefficients were calculated to describe the relationship between the overall coaching score and the coach and team demographics. As summarized in Table 6, the overall coaching behavior had a significant, moderate, positive relationship with the hours of practice per week as a team (r (39) = .41, $p < .05$, $r^2 = .16$), the hours of practice per week as an individual (r (39) = .55, $p < .05$, $r^2 = .26$), and the total weeks practiced (r (39) = .40, $p < .05$, $r^2 = .16$). As coaches exhibit more coaching behaviors, the hours of practice (team and individual) and total weeks practiced increased.

Table 6

Relationships between Coach and Team Demographics and Overall Coaching Behavior Score (N = 41)

	Number of Practices per Week	Hours of Practice per Week (Team)	Hours of Practice per Week (Individual)	Total Weeks Practiced	Years of Teaching Experience	Years of Parli. Pro. Coaching (National Level)	Years of Parli. Pro. Coaching (Any Level)
Overall Coaching Behavior Score	.16 (.10)	**.41 (.16)***	**.55 (.26)***	**.40 (.16)***	-.02 (.00)	-.08 (.00)	-.15 (.01)

Note. An (*) indicates a significant value of $p < .05$; Pearson correlation are listed first, followed by the coefficients of determination in parentheses.

Limitations

This study was a census of the 41 Parliamentary Procedure CDE team coaches. The intent was not to generalize the results to other CDEs or populations but rather to describe the population. Readers should generalize the results to broader populations with caution. A second limitation is that the coaching behaviors and all data reported in the study are self-perceived by the head coach of the parliamentary procedure team. The researchers did not measure what behaviors occurred during practice time but rather allowed the participants to identify how often they believe each behavior was exhibited during the team training.

Discussions and Implications

Objective one focused on describing the National FFA Parliamentary Procedure Career Development Event (CDE) teams and coaches. Most coaches were the agriculture teacher but there were two volunteer coaches, which is consistent with previous literature (Tillinghast et al., 2013). Overall, both the students and coaches involved in the parliamentary procedure CDE did devote a serious block of time to the event, with approximately 20 weeks spent preparing for the event, with each week including an average of 4.6 hours as a team and four hours individually spent preparing for the event. The focus of the coaches was very neutral, with a mean of 5.75 (*SD* = 2.0). The result of this item suggests that coaches may lean slightly more towards winning the event than skill improvement, but overall, the time that coaches do devote for the CDE is focused on the student.

A focus of objective two was to determine which coaching behaviors the parliamentary procedure coaches exhibited most often. Positive feedback, social support, training and instruction, and situational consideration were the top four behaviors, all of which had a mean of over a 4-Often (75%). The results are consistent with the literature from athletics that cited training behaviors and social support as top behaviors (Becker & Wrisberg, 2008; Bloom et al., 1999; Markland & Martinek, 1998). The results also coincide with past CDE studies in agricultural education, reinforcing how coaches support students through the learning process as they build valuable skills (Bowling, 2010; Voigt et al., 2013). Even though democratic and autocratic behaviors were exhibited less often, the researchers believe that all six behaviors can be beneficial. What is important is that each coach finds the behaviors that fit both their personality and is effective with their students.

A second focus of objective two was to identify the relationships between the coaching constructs. We feel that a substantial positive relationship between the training and instruction behavior and social support coaching behaviors is logical. We also feel that the positive relationship between the positive feedback and social support coaching behaviors coincides with the intent of the construct. Social support for the student members is given by the use of positive feedback from the coach, either verbally or through the use of the coach’s actions.

The third objective of this study focused on the relationships between the coach and team characteristics and the coaching behavior constructs. The amount of hours spent preparing as a team had a moderate positive relationship with the training and instruction coaching behavior.

This relationship indicates that as the training and instruction coaching behavior was exhibited more frequently, the team spent more time preparing for the event. This suggests that coaches that instructed their teams spent more time together preparing for the event.

The fact that relationships exist between the overall coaching behaviors score and the total number and hours a week spent practicing is encouraging. If a coach exhibited more self-perceived coaching behaviors, this would insinuate that more time is spent teaching and supporting the team during practice time. These relationships suggest that coaches were realistic when responding to the questionnaire and that they do show a commitment to helping other coaches train teams.

Recommendations

The researchers developed recommendations for both practicing agriculture teachers and future studies. It is recommended that professional development be offered to preservice and practicing agriculture teachers to disseminate the results of this study. There is no set recipe for success in the parliamentary procedure CDE, rather, each agriculture teacher must find the coaching behaviors that work best for their specific situation. This study can provide a broad foundation, though, on the behaviors that can be effective when training teams and lay a foundation for teachers to start building.

The researchers recommend that this study be replicated with coaches of other CDEs. Since parliamentary procedure could be considered a leadership CDE, the results of the study prompt the question; are the behaviors of a coach different between the various CDEs? Also, this study focused on the self-perceived coaching behaviors as reported by the coach. Future studies that take an observational approach and record the behaviors that are occurring are recommended. A final area that the researchers feel needs to be addressed is how the students perceive the coaching behaviors of their team coach. Further research that explores the students' perspective is needed to describe what coaching behaviors motivate students, are enjoyable, and lead to the most skill acquisition. Furthering this study to determine effective coaching behaviors could establish a research base on how to effectively adopt 21st-century skills through the use of CDEs.

References

Accel-Team (2013). Motivation theories and their theorists. Retrieved August 14, 2013 from http://www.accel-team.com/motivation/theory_02.html.

Ary, D., Jacobs, L. C., Razavieh, A., & Sorensen, C. (2006). *Introduction to research in education* (7th ed.). Belmont, CA: Thomson Wadsworth.

Becker, A. J., & Wrisberg, C. A. (2008). Effective coaching in action: Observations of legendary collegiate basketball coach Pat Summitt. *The Sports Psychologist, 22,* 197-211.

Bloom, G. A., Crumpton, R., & Anderson, J. E. (1999). A systematic observation study of the teaching behaviors of an expert basketball coach. *The Sports Psychologist, 13,* 157-170.

Bowling, A. M. (2010). *Frequency of coaching behaviors used by agriculture teachers in relation to the state Floriculture Career Development Event team rank* (Unpublished master's thesis). University of Missouri, Columbia, Missouri.

Davis, J. A. (1971). *Elementary survey analysis.* Englewood Cliffs, NJ: Prentice Hall.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2009). *Internet, mail, and mixed-mode surveys: The tailored design method* (3rd ed.). Hoboken, NJ: John Wiley & Sons.

Doerfort, D. L. (Ed.) (2011). *National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015*. Lubbock, Texas: Texas Tech University, Department of Agricultural Education and Communications.

Garton, B. L., & Chung, N. (1996). The in-service needs of beginning teachers of agriculture as perceived by beginning teachers, teacher educators, and state supervisors. *Journal of Agricultural Education 37*(3), 52-58. doi: 10.5032/jae.1996.03052.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (6th ed.). Upper Saddle River, NJ: Pearson Education.

Harris, C. R. (2008). Career development event participation and professional development needs of Kansas agriculture education teachers. *Journal of Agricultural Education, 49*(2), 130-138. doi: 10.5032/jae.2008.02130

Layfield, K. D., & Dobbins, T. R. (2002). In-service needs and perceived competencies of South Carolina agricultural educators. *Journal of Agricultural Education, 43*(4), 46-55. doi: 10.5032/jae.04046.

Markland, R., & Martinek, T. J. (1988). Descriptive analysis of coach augmented feedback given to high school varsity female volleyball players. *Journal of Teaching in Physical Education, 7,* 289-301.

Phipps, L. J., Osborne, E. W., Dyer, J. E., & Ball, A. L. (2008). *Handbook on agricultural education in public schools* (6th ed.). Clifton Park, New York: Thomson Delmar Learning.

Tauer, J. M., & Harackiewicz, J. M. (2004). The effects of cooperation and competition on intrinsic motivation and performance. *Journal of Personality and Social Psychology, 86*(6), 849-861. doi: 10.1037/0022-3514.86.6.849

The National FFA Association (2012). Career development event rules and policies. Retrieved August 14, 2013 from https://www.ffa.org/documents/cde_parlipro_2012.pdf.

Tillinghast, S., Ramsey, J. W., & Terry, R. (2013, October). Teacher perceptions of adult volunteers serving local, school-based agricultural education programs. Paper presented at the Western region meeting of the American Association for Agricultural Education, Lubbock, TX.

Vansteenkiste, M., & Deci, E. L. (2003). Competitively continent rewards and intrinsic motivation: Can losers remain motivated? *Motivation and Emotion, 27*(4), 273-299.

Voigt, M. A., Talbert, B. A., McKinley, S., & Brady, C. M. (2013). Promising coaching practices of expert dairy, horse, and livestock Career Development Event coaches: A qualitative study. *North American Colleges and Teachers of Agriculture Journal, 57*(2), 45-55.

Wrisberg, C. A. (1990). An interview with Pat Head Summitt. *The Sport Psychologist, 4,* 180-191.

Zhang, J. Jensen, B. E. & Mann (1997). Modification and revision of the leadership scale for sport. *Journal of Sport Behavior, 20*(1), 105-123.

A Case Study of the Home Visit: The Power of Personal Connection

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A Case Study of the Home Visit: The Power of Personal Connection

Introduction and Need for Research

For the purpose of this poster abstract, a home visit is the process by which the teacher schedules a time to visit with the student and their parents at the student's home during freshmen year to discuss the agricultural education program. Components of a home visit include discovering the individual student's agricultural interest, clearly defining FFA and SAE, and gathering general information about the student to facilitate their overall success. As early as 1980, home visits were reported to be on the decline (Miller, 1980). However, literature continues to point to the impact these visits can have on student success. The practice of making home visits enables teachers to build personal relationships with students (Robinson & Haynes, 2011) and these visits were specifically recommended by Vincent and Kirby (2015) as a means of encouraging culturally relevant pedagogy. While research has indicated that building relationships is critical to enhancing student engagement (Bird, Martin, Tummons, & Ball,2013); research also reveals that agricultural teachers find it difficult to balance work and personal life due to the demands of the position (Clark, Kelsey, & Brown, 2014). Thus, there is a need to document the impact of home visits in order to add to the body of research that justifies the time spent on these efforts.

Theoretical Framework

Attachment theory (Bretherton, 1992) was used to frame the case study. While attachment theory was first expressed in the 1930s in an effort to describe parental involvement and connection with children, it has more recently evolved to address broader societal situations. Attachment theory is used to explain the impact that an agricultural science teacher can have on a student early in their high school career and in the program. The process of doing a home visit with the student creates familial security and forms a basis from which the individual can form new skills and interests in other fields (Bretherton, 1992).

Methodology

Qualitative methods were used. Specifically, case study methods (Yin, 2012) were employed to capture the true essence of the home visit and the impact resulting from each case. A total of 650 home visits have been conducted since 2004 by one agriculture teacher and another 150 were made by student teachers and the other agriculture teacher in the same program. As a result of these visits, all visited students had some level of involvement in the program. Of those individuals, three individual cases were selected as unique examples of the impact of the home visit itself and can serve as an example for others. These cases were selected for documentation based on the following criteria: grade level, sibling involvement, and observed impact. The case study is a result of self-reflection and analysis of personal notes recorded by the researcher.

Results

Case No. 1

In 2004, a home visit was completed with a female freshmen student who was quiet and did not express interest in the FFA. After her home visit, she surprisingly took on the challenge of memorizing the FFA Creed in one weekend. From there forward she participated in numerous career development event teams (CDE) and held several FFA offices. She attended Harvard and completed an internship with the United States Department of Agriculture. Currently, she works for the New York Times Square planning committee, writing and editing speeches. Both of her younger sisters also engaged in the agricultural program and both of them have been elected to state offices. In a recent card from their mom she stated, "Can you believe what would've happened if you hadn't asked our oldest daughter to memorize the Creed at the home visit?"

Case No. 2
In 2010 a home visit was completed with a freshmen male who liked to build things. Following his home visit he began to develop numerous substantial SAE projects and became heavily involved in agricultural mechanics. His junior year he was an FFA chapter officer and began a Farm Power team. He made a personal goal to encourage more boys to become involved and recruited additional event coaches to coach an Agriculture Welding team. His senior year he was the co-chair of the community service committee and a participant in multiple teams. He has been accepted at a premiere university to major in Bioresource and Agriculture Engineering.

Case No. 3
In 2010, the superintendent was invited to a visit to a freshmen female student. It was a surprise to her mother when she opened the door. With a lemonade drink on the back porch, the parent, student, teacher, and administrator discussed opportunities in agricultural education at the high school. Prior to this home visit, the student had not expressed a desire to be involved with FFA. However, following the home visit she joined the first novice parliamentary procedure practice and continued on to win a national title in parliamentary procedure, complete various SAE projects, hold multiple offices, attended the Washington Leadership Conference, and was slated for state office. She will be attending Cornell University majoring in Environmental Sciences.

Conclusions

Analysis of the three cases reveals common themes regarding the impact of the home visit including: participation in CDE teams and other FFA activities, the development of SAE projects, and investment in agriculture education after graduation. All three students could have easily pursued other leadership organizations on campus, however, due to the home visit they each selected to become involved with FFA, continued to enroll in additional agricultural courses, held offices, took pride in the program, and mentored younger students. It is believed that the home visit allowed these individuals to form a connection with the program via the teacher through a "continuous caregiving relationship" (Bretherton, 1992, p. 762).

Implications and Recommendations

It is imperative for agricultural science programs to engage students outside of the normal approach of expecting students to come to the program on their own. The time investment of home visits can make a tremendous difference in the overall effectiveness of a program by creating familial relationships with the students. It is recommended to conduct home visits with freshmen during their first semester so that they create a strong relationship with their teacher from the beginning.

References

Bird, W. A., Martin, M. J., Tummons, J. D., & Ball, A. L. (2013). Engaging Students in Constructive Youth-Adult Relationships: A Case Study of Urban School-based Agriculture Students and Positive Adult Mentors. *Journal of Agricultural Education, 54(2), 29-43*. doi: 10.5032/jae.2013.02029

Bretherton, I. (1992). The origins of attachment theory: John Bowlby and Mary Ainsworth. *Developmental psychology*, *28*(5), 759.

Clark, M. S., Kelsey, K. D., & Brown, N. R. (2014). The thornless rose: A phenomenological look at decisions career teachers make to remain in the profession. *Journal of Agricultural Education*, *55*(3), 43-56. doi: 10.5032/jae.2014.03043

Miller, T. R. (1980). The changing status of supervised occupational experience in vocational agriculture in North Carolina. *Journal of Agricultural Education*, *21(1)*, *13-18*, **doi: 10.5032/jaatea.1980.01013**

Robinson, J. S., & Haynes, J. C. (2011). Value and expectations of supervised agricultural experiences as expressed by agriculture instructors in Oklahoma who were alternatively certified. *Journal of Agricultural Education, 52(2), 47-57.* **doi: 10.5032/jae.2011.02047**

Vincent, S.K. & Kirby, A.T. (2015). Words speak louder than action?: A mixed-methods case Study.*Journal of Agricultural Education*. 56(1), 32-42. doi: 10.5032/jae.2015.01032

Yin, R. K. (2012) *Applications of case study research*. Los Angeles: Sage Publications, Inc.

Aligning the Educational Foci in a College of Agriculture: Gaining Student Feedback

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Aligning the Educational Foci in a College of Agriculture: Gaining Student Feedback

Introduction

New educational approaches are constantly being introduced to increase student learning. Reform efforts have been made through curriculum creation and changes (Lambert, Velez, & Elliott, 2014; Warnick, Thompson, & Gummer, 2004), delivery methods (Sandlin, Murphrey, Lindner, & Dooley, 2013; Williams, Warner, Flowers, & Croom, 2014), educator professional development (Shoulders & Myers, 2014), and more. One notable addition to this list was student inclusion in the educational decision making process (Levin, 2000; Platz, 1994). Levin (2000) argued that “education reform cannot succeed and should not proceed without much more direct involvement of students in all its aspects” (p. 155). Historically, agricultural education fosters student engagement in the education process (Dyer & Osborne, 1996) and requires agriculture students to think and act on an interdisciplinary, system-level (Bawden, 1991).

As part of the strategic planning process, administration and faculty in the College of Tropical Agriculture and Human Resources (CTAHR) developed four educational foci to describe the primary areas in which students are trained as life-long learners in CTAHR. These foci, in part, are meant to present programs in CTAHR in a broader, interdisciplinary format and attract potential students. To promote student involvement in the academic planning process, administration and faculty sought student opinions of the foci, gained student perceptions on how the foci can be used, and explored student-vetted titles for each focus.

Conceptual framework

The framework for this study is the andragogical process model (Knowles, Holton, & Swanson, 2011). This model allows for the instructor to plan/carry out needs assessments, implement, and evaluate in a collaborative effort with the learners. Specifically, this study is focused on the planning stage of the process model. This type of involvement creates motivation, ownership, and a more relevant experience for the learner (Knowles et al., 2011). This is supported by Priority 4-Meaningful, Engaged Learning in All Environments and Priority 5-Efficient Effective Agricultural Programs of the American Association for Agricultural Educator’s (AAAE) National Research Agenda (Doerfert, 2011).

Methodology

Data were collected according to focus group methods. Students were purposefully chosen (Lincoln & Guba, 1985) to represent the undergraduate population of CTAHR at the University of Hawai’i at Mānoa. Participants were enrolled as undergraduate, degree-seeking students in CTAHR and a junior or senior by academic hours. Nine students participated. No identifying information was collected; students were coded S1-9. Students were asked to read a draft of the foci descriptions before participating in the focus group to enhance conversation quality. A semi-structured interview protocol was created to guide the focus group conversation. The data were analyzed using the constant comparative method (Glaser & Strauss, 1967). Trustworthiness was established through credibility, transferability, dependability, and confirmability. Credibility was established through triangulation; transferability was established through purposive sampling; and dependability and confirmability were established through the creation of an audit trail and reflexive journal (Lincoln & Guba, 1985). Four themes emerged from the data: (a) Uses of educational foci, (b) accuracy of foci, (c) suggestions to improve the foci, and (d) foci titles.

Results

Students found the foci to be “attractive” (S1) because current and potential students will know what to expect in their field of study (S1, S2, S3) and be able to make interdisciplinary connections (S1-S9). Student S1 indicated that each department is doing their part, but system-connections are not being made. Students believed there was interesting work going on within the college that they are not exposed to, which would be interesting and potentially beneficial to explore. Interdisciplinary exposure and experiential learning was mentioned by all students as critical components in their personal career success and for success as an industry. Students also indicated the foci could attract potential students, provide insight into educational pathways and careers, and would be a good way to learn “a little more about what they are getting into” (S2).

All students were concerned with the accuracy of the foci descriptions. They felt some of the information is exaggerated and misrepresents what CTAHR is doing. For example, student S9 said, “I like what these statements are saying, but if someone was to look at courses they can take for sustainability or organic production, the reality is those aren’t available.” Additionally, students S2, S3, and S9 mentioned the inclusion of cultural terms and concepts into the descriptions. “Focus 3 mentions ‘ahupua’a’ and I have never heard anything related to our ahupua’a in the environmental stuff that I’ve done in CTAHR” (S2).

Students were also asked to provide points of improvement. Students found the descriptions of the foci to be too academic. “A lot of these words <pointing to foci descriptions> are words that old professors come up with” (S6). Student S3 suggested each foci description begin with a concise summary statement that can be easily understood. The descriptions also needed to include buzz words to grab the attention of potential students, stakeholders, and general readers (S1, S6). “I like big, bold statements. ‘I go to CTAHR to train to become a superhero and save the world’” (S6).

At the end of the discussion, students were asked to suggest titles for each of the foci that would be interesting to them and representative of what CTAHR does. The students presented a number of titles, and the faculty and administration agreed with and formally titled the educational foci as: Community Health and Resiliency, Food and Agricultural Systems, Environment and Ecosystem Management, and Global Markets and Innovative Design.

Conclusions and Recommendations

In accordance with the andragogical process model (Knowles et al., 2011), this study sought learner input into the alignment of the CTAHR curriculum. Levin (2000) wrote that educational reform will not succeed without the involvement of the learners and, from the findings of this study, it can be concluded that the creation and use of these foci without student input may have resulted in negative or neutral response from the intended audiences. Although the students were supportive of the presented foci, they were concerned with the content and cultural accuracy of the foci descriptions, the academic language used, and the lack of passion and excitement that they feel about their disciplines. It can be concluded that, like educators (Lambert et al., 2014; Sandlin et al., 2013; Shoulders & Myers, 2014; Warnick et al., 2004; Williams et al., 2014), students are also looking for new and engaging learning environments. The students' focus on interdisciplinary learning and experiential education reiterates the andragogical need for content relevance and learner input (Knowles et al., 2011).

It is recommended that educational programs seek input from former, current, and potential learners to create content and approaches that are meaningful, effective, and engaging to the target audiences (Knowles et al., 2011; Levin, 2000). These efforts will result in agricultural programs that are in alignment with Priorities 4 and 5 of the AAAE's National Research Agenda (Doerfert, 2011).

References

Bawden, R. J. (1991). Systems thinking in agriculture. *Journal of Dairy Science, 74*(7), 2362-2373. Retrieved from http://www.journalofdairyscience.org/article/S0022-0302(91)78410-5/pdf

Doerfert, D. L. (Ed.). (2011). *National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015.* Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications.

Dyer, J. E., & Osborne, E. W. (1996). Developing a model for supervised agricultural experience program quality: A synthesis of research. *Journal of Agricultural Education, 37*(2), 24-33. doi: 10.5032/jae.1996.02024

Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory*. Chicago, IL: Aldine.

Knowles, M. S., Holton, E. F., & Swanson, R. A. (2011). *The adult learner: The definitive classic in adult education and human resource development* (7th ed.). Burlington, MA: Elsevier.

Lambert, M. D., Velez, J. J., & Elliott, K. M. (2014). What are the teachers' experiences when implementing the curriculum for agricultural science education? *Journal of Agricultural Education, 55*(4), 100-115. doi: 10.5032/jae.2014.04100

Levin, B. (2000). Putting students at the centre in education reform. *Journal of Educational Change, 1*(2), 155-172. doi: 10.1023/A:1010024225888

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications, Inc.

Platz, D. L. (1994). Student directed planning: Fostering student ownership in learning. *Education, 114*(3), 420-422.

Sandlin, M. R., Murphrey, T. P., Lindner, J. R., & Dooley, K. E. (2013). Impacts of a faculty abroad experience on teaching style and technology use in a college of agriculture and life sciences. *Journal of Agricultural Education, 54*(3), 186-197. doi: 10.5032/jae.2013 .03186

Shoulders, C. W., & Myers, B. E. (2014). Effective professional development in agriscience education: An examination of core features. *Journal of Agricultural Education, 55*(1), 167-185. doi: 105032/jae.2014.01167

Warnick, B. K., Thompson, G. W., & Gummer, E. S. (2004). Perceptions of science teachers regarding the integration of science into the agricultural education curriculum. *Journal of Agricultural Education, 45*(1), 62-73. doi: 10.5032/jae.2004.01062

Williams, M. R., Warner, W. J., Flowers, J. L., & Croom, D. B. (2014). Teaching with technology: North Carolina agriculture teachers' knowledge acquisition, attitudes, and identified barriers. *Journal of Agricultural Education, 55*(5), 1-15. doi: 10.5032/jae.2014 .05001

An Analysis of Engineering Content embedded within Western United States' Agricultural Education Standards

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An Analysis of Engineering Content embedded within Western United States' Agricultural Education Standards

Introduction/ Need for Research

National standards such as the Common Career Technical Core (CCTC) (NASDCTEC, 2012) and the Next Generation Science Standards (NGSS) (NRC, 2012) call for increasing student exposure to engineering in K12 education. Students are being asked to learn engineering practices such as design and optimization in middle school and high school. The CCTC presents an argument for students developing skills to apply engineering principles in power, structure, and technical systems. The NGSS envisions students adopting engineering practices and applying the engineering design process throughout all science classes. It is not known to what extent these national standards have been implemented in state agricultural education curricula. This study investigates western state agricultural education standards to evaluate their engineering content. With increased societal pressure to educate students in science, technology, engineering, and mathematics (i.e. STEM), emphasis on agricultural education as a science-focused discipline has increased (Wilson & Curry Jr., 2011). This study addresses Priority Area 3 of the National Research Agenda: Sufficient Scientific and Professional Workforce That Addresses the Challenges of the 21st Century (Doerfert, 2011).

Theoretical Framework

Learning is most effective when it occurs in a meaningful context (Doerfert, 2011). Engineering provides a context for students to learn concepts of agricultural science in context. Situated learning (Lave & Wenger, 1991) serves as the framework for this study. Situated learning places the learner in a community of practice to provide a context for knowing the background and practices of the community. The National Academy of Sciences (2009) issued a report entitled *Transforming Agricultural Education for a Changing World* which states: "Our world is changing at an increasing pace and unleashing a complicated set of problems and opportunities" (p. 1). These problems require the ability to use science and mathematical knowledge in context. Researchers have found improved student learning of STEM concepts when taught in a practical context, such as agriculture (Parr, Edwards, & Leising, 2006; Stone, Alfeld, & Pearson, 2008; Rich, Duncan, Navarro, & Ricketts, 2009; Clark, S. (2012). The inclusion of engineering in agricultural education allows students to take on the role of a problem solver in agricultural contexts. This approach situates both traditional science concepts along with agricultural science concepts in a real-to-life context, which allows students to better understand what they are learning.

Methods

This study employed content analysis to evaluate state agricultural education standards. All states (total of 24) west of the Mississippi River were included in the study. Career and Technical Education (CTE) standards for each state were located (if possible) through the help of a database managed by the Association for Career and Technical Education (ACTEonline.org). This database provides a high-level analysis of existing CTE standards for each state. In addition,

Internet searches were initiated using the search terms “[State] agriculture education standards.” Once a state’s CTE standards were located, it was evaluated for agricultural education components. Any agricultural education-related components were copied into an Excel database. Any text not related to the individual standards was removed. After processing the Excel database consisted of a list of the agricultural education standards text for each state.
The standards for each state were further analyzed to identify engineering-related concepts. Each standard was evaluated for the presence of engineering concepts, which might be identified using keywords such as “engineer,” “engineering,” and “design.” The resulting list of standards was categorized by state, career pathway, and course or focus. This process was initially completed in May of 2014 and was repeated in June of 2015 to identify and include newly published standards, which were found in 3 states.

Results / Findings

Agricultural education standards were located for half (12) of the 24 states included in the study. The text of the standards included 81,017 sentences and 17, 850 individual standards. The average number of standards was 1,487 with a standard deviation of 1,295. Nevada has the largest number of standards (4,119) and Alaska has the smallest (40). Only a small percentage of these standards included engineering content. Of the twelve states publishing agricultural education standards, 83% included at least one standard with engineering content. However, only 0.15% (27) of the total number of standards (17,850) included engineering. These standards covered a broad range of content areas and primarily focused on design. Animal Systems pathways called for students to design an enclosure for livestock. Environmental Systems pathways discussed designing solutions to fluid flow problems and environmental issues. Plant Systems called for designing a greenhouse and landscape irrigation system. Power, Structural, and Technical systems was more broad and covered concepts such as designing generic projects, hydraulic systems, plumbing, control systems, electrical systems, and metal products.

Conclusion

Engineering concepts represent a small percentage of the total number of agricultural education standards published by the 24 states west of the Mississippi River. Although the percentage of standards is small, the fact they exist provides an opportunity for curriculum developers and agricultural educators to implement national standards in such as NCTC and NGSS in their programs. The diverse range of pathways which include engineering-related standards point to the potential of teaching engineering practices in a majority agricultural education programs.

Implications/Recommendations/Impact on Profession

This research contributes to agricultural education by identifying specific content areas appropriate for including standards-based engineering content. The CCTC and the NGSS call for integration of engineering into agricultural education and science courses. This research supports the work of curriculum developers and agricultural literacy programs (such as Agriculture in the Classroom) by identifying content areas appropriate for integration of engineering concepts. We recommend engineering concepts be evaluated more broadly for integration into state agricultural education standards, district policies, and classroom curriculum.

References

Association for Career and Technical Education (ACTEonline.org)

Clark, S. (2012). Science achievement of secondary agricultural education students. (Unpublished doctoral dissertation). Auburn University, Auburn, Alabama.

Doerfert, D. L. (Ed.) (2011). *National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015*. Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.

National Academy of Sciences. (2009). *Transforming agricultural education for a changing world.* Washington, DC: The National Academies Press

National Association of State Directors of Career Technical Education Consortium/National Career Technical Education Foundation (2012). *Common Career Technical Core.* National Association of State Directors of Career Technical Education Consortium/National Career Technical Education Foundation, Silver Spring, MD.

National Research council, 2013. *Next generation science standards.* Washington, DC: National Academies Press.

Parr, B., Edwards, C., & Leising, J. G. (2006). Effects of a math-enhanced curriculum and instructional approach on the mathematics achievement of agricultural power and technology students: An experimental study. *Journal of Agricultural Education,* 47(3), 81–93. doi:10.5032/jae.2006.03081

Rich, J., Duncan, D., Navarro, M., & Ricketts, J. (2009). Examining differences in middle school Student achievement on a criterion-referenced competency test (CRCT) in science. *Journal of Agricultural Education*, 50(4), 14–24. doi:10.5032/jae.2009.04014

Stone, J. R., Alfeld, C., & Pearson, D. (2008). Rigor and relevance: Enhancing high school students' math skills through career and technical education. *American Educational Research Journal*, 45(3), 767–795. doi:10.3102/0002831208317460

Wilson, E. B., & Curry Jr., K. W. (2011). Outcomes of integrated agriscience processes: A synthesis of research. *Journal of Agricultural Education, 52*(3), 136-147. Doi: 10.5032/jae.2011.03136

Bioenergy Science and Engineering as Components of Ag Education Curricula

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Bioenergy Science and Engineering as Components of Ag Education Curricula

Introduction/ Need for Research

It is important for the "entire global food and agriculture system be reflected in the [agricultural education] curriculum (Doerfert, 2011, p. 26). However, teaching about energy crops is new in the agricultural education field (Sallee, Edgar, & Johnson, 2013). Teachers recognize the importance of bioenergy careers but do not have confidence in their knowledge about these career choices (Christensen, Warnick, Spielmaker, Tarpley, & Straquadine, 2009). Additionally, teachers agree on the importance of biomass production and believe it should be taught in existing agricultural education classes (Han, 2014). However, curricula have not yet been developed to meet this need (Acker, 2008). In accordance with priority five of the National Research Agenda (Doerfert, 2011), this study aimed to develop a list of key bioenergy concepts for use in agricultural education programs. These concepts can be used to guide the development of curriculum to support the teaching of bioenergy concepts, including biomass production.

Theoretical Framework

Learning is most effective when it occurs in a meaningful context (Doerfert, 2011). Bioenergy provides a context for students to learn concepts of biology, chemistry, physics, earth science, and economics. Situated learning (Lave & Wenger, 1991) places the learner in a community of practice which provides a context for knowing the background and practices of the community. The inclusion of bioenergy in agricultural education allows students to take on the role of a biomass producer who must understand the larger issues associated with biomass crops and alternative energy needs. This approach situates agriscience concepts in a real-life context and allows students to better understand the issues.

Methodology

This study was conducted using a mixed-method three-round "Classical Delphi" methodology (Dalkey & Helmer, 1963; Okoli & Pawlowski, 2004). This approach was used to identify important concepts for a K12 bioenergy education framework and develop consensus among a group of bioenergy experts. To this end, educators and researchers (N=20) from the National Institute of Food and Agriculture bioenergy grant research community were recruited to participate on an expert panel, charged with developing a consensus on the essential bioenergy concepts for K12 students. A traditional three-round Delphi methodology was used to foster a consensus around core bioenergy concepts. In round one, the experts were asked to list all the concepts they believed were essential to teaching bioenergy at the K12 level. The participant's responses were qualitatively coded for bioenergy concept themes. In round two, experts were asked to rate (1=non-essential to 5=essential) how essential each of the themes were. Concepts with a rating below 4 were removed from the list as not being essential. In round three, participants again rated the shortened list on importance.

Results/Findings

Of the 21 experts who agreed to participate in the study, eight completed all three rounds. After coding round one, 20 themes emerged. After round two, nine themes were removed from the list because they were rated below a 4 (1=non-essential to 5=essential) by at least two-thirds of the respondents. Table 1 shows the final list of bioenergy themes and their ratings.

Table 1

Bioenergy Science and Engineering Themes Identified by Experts for K12 Education (N=8)

Theme	Field	*M*	*SD*
Energy requirements: Quantity and type of energy needed	Engineering	4.88	0.35
Energy consumption: Current and historical energy sources	Engineering	4.88	0.35
Climate change: Historical record and projected consequences	Science	4.88	0.52
Nature of engineering: How engineering is important to bioenergy	Engineering	4.63	0.52
Energy fundamentals	Engineering	4.63	0.52
Work, energy, conversions	Science	4.63	0.52
Lifecycle assessment: Environmental impacts cradle to grave	Science	4.50	0.52
Photosynthesis: How light energy is stored in plants	Science	4.38	0.46
Conversion principles: Types of biomass conversions	Science	4.38	0.52
Chemical cycles: Water, carbon, nitrogen cycles	Science	4.25	0.35
Ecosystems: Ecology and human impact	Science	4.25	0.52

Note. Items ranked on a scale of 1= non-essential to 5=essential.

Conclusion

Because bioenergy is a new field in agricultural education it can be difficult for educators to choose appropriate topics from among the many available. This study yielded 11 important themes, producing a framework for teachers to integrate aspects of bioenergy concepts into agricultural education classrooms. The bioenergy concepts framework highlights the need for basic understandings of energy along with a better understanding of basic biology concepts such as photosynthesis, chemical cycles, and ecosystems. Furthermore, these findings provide a framework for educators to facilitate learning in a community of practice because it provides students with a context for knowing the key concepts and practices of bioenergy and biomass production.

Implications/Recommendations/Impact on Profession

This research contributes to the field by providing guidance regarding important bioenergy concepts applicable to agricultural education classrooms. Because these themes emerged from a K12 education context, these findings have implications not only for secondary agriculture teachers, but also agricultural literacy programs, such as Agriculture in the Classroom, in the primary grade levels. We recommend state agriculture teacher associations work with university faculty in developing and distributing this curricula. Furthermore, we recommend teachers and university faculty utilize the themes and concepts from this study when developing bioenergy curricula. Finally, we recommend needs assessment studies and professional development regarding the teaching of bioenergy concepts be conducted among agriculture teachers.

References

Acker, D., & National 25x'25 Agriculture/Forestry Steering Committee (2008). Research and Education Priorities in Agriculture, Forestry and Energy to Achieve the 25x25. *North American Colleges and Teachers of Agriculture Journal*, (March), 55–59.

Christensen, J., Warnick, B., Spielmaker, D., Tarpley, R., & Straquadine, G. (2009). Agricultural in-service needs of introductory level career and technical education teachers. *Journal of Agricultural Education*, *50*(4), 1-13. doi: 10.5032/jae.2009.04001

Dalkey, N., & Helmer, O. (1963). An experimental application of the Delphi method to the use of experts. *Management Science*, *9*(3), 458-467.

Doerfert, D. L. (Ed.) (2011). *National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015.* Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications. Retrieved from: http://aaaeonline.org/National-Research-Agenda

Han, G. (2014). *Perceptions of secondary school agriculture teachers regarding biomass production education in Iowa* (Unpublished dissertation). Iowa State University, Iowa.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.

Okoli, C., & Pawlowski, S. D. (2004). The Delphi method as a research tool: an example, design considerations and applications. *Information & Management*, *42*(1), 15-29.

Sallee, C. W., Edgar, D. W., & Johnson, D. M. (2013). Student perceptions of instructional methods towards alternative energy education. *Journal of Agricultural Education, 54*(2), 130–142. doi:10.5032/jae.2013.02130

Science Teachers' Perceptions of Science Integration In Agricultural Education

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Science Teachers' Perceptions of Science Integration In Agricultural Education

Introduction

Integration of core subject matter (including science) in agricultural education has been emphasized by Career and Technical Education (CTE) legislation (Threeton, 2007) and by the push to improve Science, Technology, Engineering, and Math (STEM) education (Sanders 2009). Some states, including Texas, are awarding science credit for some agriculture classes. In a state with over 1,500 agricultural education programs, a lot of potential exists in Texas for teaching science concepts through agriculture (R. Whitson, personal communication). Studies show that agriculture students perform similarly or better than students who did not receive agriculture instruction integrated with science (Chiasson & Burnett, 2001; Haynes, Robinson, Edwards, & Key, 2012; Myers & Dyer, 2006; Pearson, Young, & Richardson, 2013; Ricketts, Duncan & Peake, 2006; Shoulders & Myers, 2013). Research in other states indicates science teachers support the integration of science in agricultural education and collaboration between agricultural education teachers and science teachers is important (Thompson & Warnick, 2007; Warnick, Thompson, & Gummer, 2004). Since no research has focused on the perceptions of Texas teachers towards the integration of science in agricultural education, this study sought to determine Texas science teachers' perceptions of science integration in agricultural education.

This study addressed Priority Five, Efficient and Effective Agricultural Education Programs, of the National Research Agenda for the American Association for Agricultural Education (Doerfert, 2011).

Theoretical/Conceptual Framework

The Theory of Planned Behavior (Ajzen, 1991) was used as a framework for this study. This theory suggests a person's behavior is influenced by their attitudes, subjective norms, and perceived behavioral control. This study focuses on the attitudes of science teachers by determining their perceptions of the integration of science in agricultural education. The target behavior of science teachers in this study is their collaboration with agriculture teachers who are integrating science into their agriculture curriculum. The collaboration between agriculture teachers and science teachers aids in the successful integration of science in agricultural education (Johnson & Newman, 1993).

Methodology

This study used a descriptive survey design using the first section of the Integrating Science Survey Instrument developed by Thompson (1996). Demographic questions were added to the instrument. In total there were 28 instrument items and 14 demographic questions. The 28 items were provided in a five-point Likert scale format (1 = strongly agree, 5 = strongly disagree). For the purpose of reporting, it was decided a priori that aggregate mean responses for the items would be interpreted as strongly disagree for means of 4.50 or higher, disagree for means of 3.50 to 4.49, neutral for means of 2.50 to 3.59, agree for means of 1.50 to 2.59, and strongly agree for means below 1.50.

To administer the survey, researchers attended the Conference for the Advancement of Science Teaching (CAST). The researchers had a booth in the conference trade show and asked science teachers in attendance to participate in the study. Teachers who participated were entered into a prize drawing for one of three $100 gift cards. Teachers who volunteered to participate were asked to complete the instrument in the booth and were provided with an iPad with a Qualtrics app. To maintain confidentiality, participants did not provide their name or other identifying information as a part of the instrument. After they completed the instrument they were given a prize drawing slip to complete and place in the prize drawing box.

The population of this study was Texas science teachers attending the CAST, which is hosted by the Science Teachers Association of Texas. A convenience sample of 116 science teachers was obtained. The participants had taught for an average of 10 years. Eighty-two percent of the participants were female, and were on average 37 years of age. Thirty-seven participants (32%) claimed their school offered science credit for at least one agriculture course.

Results/Conclusions

The purpose of this study was to determine science teachers' perceptions of integrating science in agricultural education. Of the 28 items the participants strongly agreed with four of them. Those items were "Agriculture is an applied science," People pursuing a career in agriculture must have a greater understanding of science than ten years ago," Agriculture students learn more about agriculture when science concepts are an integral part of their instruction, and "Agriculture students are more motivated to learn scientific concepts when they are integrated into the agriculture curriculum." The participants agreed with 23 of the items. Participants were neutral on one item, "The agriculture teacher in my school is competent enough in science to teach integrated science concepts." The participants did not disagree or strongly disagree with any of the items.

Since the participants agreed or strongly agreed with all but one item in the instrument it suggests that science teachers have a positive perception of integrating science in agricultural education. These results show that the participants in this study overall had a more positive perception of science integration in agricultural educations than previous studies that gauged perceptions of science teachers, agriculture teachers, and administrators (Balschweid & Thompson, 2002; Thompson, 1996; Thompson, 2001; Warnick, Thompson, & Gummer, 2004),

Implications/Recommendations

Implications of this study suggest 1) as time progresses science teachers (and perhaps other stakeholders) have more positive perceptions of the integration of science in agricultural education, or 2) the differences are based on the location of the study. It is recommended the same study be conducted in states where a similar study has been previously conducted to determine if there is a change in perceptions. If a change is indicated, it could imply that the more positive perceptions are due to time. If no major changes are seen in those states it would imply the location of the study was the factor that impacted the differences in perceptions.

References

Ajzen, I, (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179-211

Balschweid, M.A. & Thompson, G. W. (2002). Integrating science in agricultural education; attitudes of Indiana agricultural science and business teachers. *Journal of Agricultural Education.* 43(2), 1-10. doi: 10.5032/jae.2002.02001

Chiasson, T. C. & Burnett, M. F. (2001). The influence of enrollment in agriscience courses on the science achievement of high school students. Journal of Agricultural Education, 42(1), 61-71. doi: 10.5032/jae.2001.01061

Doerfert, D. L. (Ed.) (2011). National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015. Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications.

Haynes, J. C., Robinson, J. S., Edwards, M. C., & Key J. P. (2012). Assessing the effect of using a science-enhanced curriculum to improve agriculture students' science scores: A casual comparative study. Journal of Agricultural Education, 53(2), 15-27. doi: 10.5032/jae.2012.02015

Johnson, D. & Newman, M. E. (1993). Perceptions of administrators, guidance counselors, and science teachers concerning pilot agriscience courses. *Journal of Agricultural Education*, 34(2), 46-54. doi: 10.5032/jae.1993.02046

Myers, B. E., & Dyer, J. E. (2006). Effects of investigative laboratory instruction on content knowledge and science process skill achievement across learning styles. Journal of Agricultural Education, 47(4), 52-63. doi: 10.5032/jae.2006.04052

Pearson, D., Young, R. B. & Richardson, G. B. (2013). Exploring the technical expression of academic knowledge: The science-in-CTE pilot study. Journal of Agricultural Education, 54(4), 162-179. doi: 10.5032/jae.2013.04162

Ricketts, J. C., Duncan, D. W., & Peake, J. B. (2006). Science achievement of high school students in complete programs of agriscience education. Journal of Agricultural Education, 47(2), 48-55. doi: 10.5032/jae.2006.02048

Sanders, M. (2009). STEM, STEM Education, STEMmania. The Technology Teacher, 20-26. Retrieved from://esdstem.pbworks.com/f/TTT+STEM+Article_1.pdf

Shoulders, C. W. & Myers, B. E. (2013). Socioscientific issues-based instruction: An investigation of agriscience students' content knowledge based on student variables. Journal of Agricultural Education, 54(3), 140-156. doi: 10.5032/jae.2013.03140

Threeton, M.D . (2007). The Carl D. Perkins Career and Technical Education (CTE) Act of 2006 and the roles and responsibilities of CTE teachers and faculty members. At Issue, 44(1), 66-82.

Thompson, G.W. (1996). Characteristics and implications of integrating science in secondary agricultural education programs. Unpublished doctoral dissertation, University of Missouri-Columbia, Columbia.

Thompson, G.W. (2001). Perceptions of Oregon secondary principals regarding integrating science into agricultural science and technology programs. *Journal of Agricultural Education*. 42(1), 50-60. doi: 10.5032/jae.2001.01050

Thompson, G. W. & Warnick, B. K. (2007). Integrating science into the agricultural education curriculum: Do science and agriculture teachers agree? Journal of Agricultural Education, 48(3), 1-12. doi: 10.5032/jae.2007.03001

Warnick, B.K., Thompson, G.W., Gummer, E.S. (2004). Perceptions of science teachers regarding the integration of science into the agricultural education curriculum. *Journal of Agricultural Education*. 45(1), 62-73. doi: 10.5032/jae.2004.01062

Task Value and Critical Thinking of Agricultural Dual Enrollment Students

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Task Value and Critical Thinking of Agricultural Dual Enrollment Students

Introduction/ Theoretical Framework

Dual enrollment programs, implemented through a partnership with universities, offer high school students college credit in combination with their secondary courses. Aside from earning valuable credits toward their college education, a student's decision to engage in dual enrollment may be correlated to the student's task value and level of critical thinking. Various theoretical models on achievement motivation indicated individuals' achievement-related ideals are important determinants of these outcomes. Models such as the expectancy-value theory (Atkinson, 1957; Eccles, Adler, Futterman, Goff, Kaczala, Meece, & Midgley, 1983), attribution theory (e.g., Weiner, 1979, 1985), and self-efficacy (Bandura, 1986, 1989; Schunk, 1984) have stated individuals' perceptions of ability on accomplishing task and expectancies for success, play a large role in their motivation to perform a given task. Individuals will tend to carry out task they positively value and avoid negatively valued task (Atkinson, 1957; Eccles et al., 1983; Feather, 1982).

Along with the value dual enrollment students' associate with various educational tasks, the utilization of critical thinking is also a factor of student success. Over the years, many definitions of critical thinking have been rendered and most of them emphasize questioning and reasoning, recognizing assumptions, presenting and evaluating data, and drawing conclusions (e.g., Facione 2009; Gadzella, Hogan, Masten, Stacks, Stephens, & Zascavage, 2006; Tsui 2002). Lang (2000) defined critical thinking as a dialogical process which produces an increasingly sound, well-grounded, understanding of the topic. Furthermore, critical thinking involves the learner developing and examining their ideas to the fullest extent, presenting them clearly to others, and challenging the ideas of others.

To better understand the task value the dual enrollment students associate with their coursework, and to gauge the students' abilities of thinking critically, this study sought to explore the task value and critical thinking of students taking agriculture dual enrollment courses.

Methodology

The sample population for this study was students enrolled in an animal science or horticulture online dual enrollment course through Eastern New Mexico University. Task value and critical thinking measures were developed from the Motivated Strategies for Learning Questionnaire (MSLQ) (Duncan & McKeachie, 2005). This instrument had a 1-6 rating scale within each construct. Current reliability reported was .83 for critical thinking and .91 for task value. Surveys were completed through Surveymonkey with a response rate of 91% (n = 261).

Results/ Findings

We found when students were surveyed about their motivation and attitudes, the students indicated the most agreement with the statement about importance to learn the course material (M = 5.77, SD = 1.30). "I think I will be able to use what I learn in this course in other courses", was the statement which students indicated the lowest level of agreement (M = 5.38, SD = 1.38). Task value scores had a mean average of 5.56.

In regard to critical thinking, students indicated the highest level of agreement with the statement on trying to play around with their own ideas in relation to their learning ($M = 5.29$, $SD = 1.49$). With a mean of 4.88 ($SD = 1.54$) students indicated the lowest agreement with the statement "I often find myself questioning things I hear or read in this course to decide if I find them convincing". Critical thinking mean scores had an average of 5.12.

A Pearson product-moment correlation was conducted to describe the relationship between the participants' responses, regarding motivation for and attitudes about dual enrollment classes. A low, negative relationship (Davis, 1971) existed between ethnicity and the students' interest level in the content area ($r = -.14$, $p < .05$). Positive, substantial relationships existed between the students' perception that they can use the subject matter learned, in other courses and importance to learn the course material ($r = .67$, $p < .01$), interest level in the content area ($r = .55$, $p < .01$), usefulness of course material ($r = .56$, $p < .01$), liking the subject matter ($r = .56$, $p < .01$), and importance of understanding the subject matter ($r = .58$, $p < .01$).

Table 1

Task Value Measure of Dual Enrollment Students

Statement	*M*	*SD*
It is important for me to learn the course material in this class	5.77	1.30
I think the course material in this class is useful for me to learn	5.65	1.27
I like the subject matter of this course	5.55	1.34
Understanding the subject matter is very important to me	5.53	1.33
I am very interested in the content area of this class	5.48	1.40
I will be able to use what I learn in this course, in other courses	5.38	1.38

Table 2

Critical Thinking Measure of Dual Enrollment Students

Statement	*M*	*SD*
I play around with ideas of my own related to what I am learning in this course.	5.29	1.49
I use course material as a starting point and then make my own ideas about it.	5.18	1.37
When a conclusion is presented in class I try to decide if there is good evidence.	5.16	1.41

Whenever I hear a conclusion in this class, I think about possible alternatives.	5.11	1.41
I often question things I hear or read in class to decide if I find them convincing	4.88	1.54

Conclusions/Recommendations

It was found that dual enrollment students had higher task value scores than critical thinking scores. The students indicated a high perceived task value towards the importance of the course material. This may imply that the dual enrollment students associate their courses with a positive task value. In regard to critical thinking, students indicated high levels of critical thinking on all five items of the instrument. To ascertain a source of comparison, the dual enrollment students' critical thinking and task values scores should be compared to the scores of secondary students, not involved in the dual enrollment program. Further studies should be conducted to examine whether the dual enrollment students retain their perceptions of task value and critical thinking throughout their post-secondary education. This study should also be replicated in other states and universities to increase the generalizability of the findings.

References

Atkinson, J. W. (1957). Motivational determinants of risk taking behavior. *Psychological Review, 64*, 359-372.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychology, 44,* 1175-1184.

Davis, J. A. (1971). *Elementary survey analysis*. Englewood Cliffs, NJ: Prentice Hall.

Duncan, T. G., & McKeachie, W. J. (2005). The making of the motivated strategies for learning questionnaire. *Educational psychologist, 40*(2), 117-128.

Eccles (Parsons), J., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J. L., & Midgley, C. (1983). Expectancies, values, and academic behaviors. In J. T. Spence (Ed.), Achievement and achievement motivation (pp. 75-146). San Francisco, CA: Freeman.

Facione, P. A. (2009). *Critical thinking: what it is and why it counts*. Millbrae, CA: California Academic Press.

Feather, N. T. (1982). Expectancy-value approaches: Present status and future directions. In N. T. Feather (Ed.), Expectations and actions: Expectancy-value models in psychology (pp. 395-420). Hillsdale, NJ: Erlbaum.

Gadzella, B. M., Hogan, L., Masten, W., Stacks, J., Stephens, R., & Zascavage, V. (2006). Reliability and validity of the Watson-Glasere critical thinking appraisal forms for different academic groups. *Journal of Instructional Psychology 33*(2), 141–4.

Lang, D. (2000). Critical thinking in web courses: An oxymoron? *Syllabus*, *14*(2), 20–24.

Schunk, D. H. (1984). Self-efficacy perspective on achievement behavior. *Educational Psychologist, 19*, 48-58.

Tsui, L. (2002). Fostering critical thinking through effective pedagogy: evidence from four institutional case studies. *Journal of Higher Education 73*(6), 740–63.

Weiner, B. (1979). A theory of motivation for some classroom experiences. *Journal of Educational Psychology, 11*, 3-25.

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review, 92,* 548-573.

Examination of STEM Knowledge Gained by 4H Youth involved in a Science Camp

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Examination of STEM Knowledge Gained by 4H Youth involved in a Science Camp

Introduction/Need for Research

According to Agriculture Secretary Tom Vilsack, a 2015 employment opportunities report shows "tremendous demand for college graduates with a degree in agricultural programs with nearly 60,000 high-skilled job openings annually in food, agriculture, renewable natural resources, and environment fields in the US....yet only 35,000 graduates to fill them… and jobs in STEM areas are expected to grow" (USDA, 2015, p. 1). However, research indicates that youth need to be recruited into agriculture and natural resource degree programs to match this industry demand (Goecker, Smith, Smith, & Goetz, 2010.) The Association of Public and Land-grant Universities (2009) encourages educators to increase K-12 education efforts in STEM (science, technology, engineering, and mathematics) disciplines. Extension's youth development program, 4-H, is the largest out-of-school educational program in Montana. Research has shown that students involved in 4-H participated in more science classes and show more interest in science in general; therefore, 4-H offers an excellent platform for science education (Heck, Carlos, Barnett, & Smith, 2012). The combination of 4-H, experiential learning, and inquiry-based learning have yielded positive results in youth day camps that focus on STEM awareness and education (Dillivan & Dillivan, 2014). These concepts were used to design a one-day camp for 4H youth to assess knowledge, interest, and career ambitions within STEM and natural resource fields. This research addressed the National Research Agenda Priority Area Four, Meaningful Engaged Learning in All Environments (Doerfert, 2011).

Theoretical Framework and Literature Review

Two ways youth can explore STEM are through experiential and inquiry-based learning. Inquiry-based learning involves breaking down the scientific process into phases, eventually forming an inquiry cycle so that students can draw out scientific thinking (Pedaste et al., 2015). Kolb's (1984) four stages of learning and his two concepts of grasping and transformation are most helpful in understanding the active learning process and cycle in experiential learning (Enfield, Schmitt-McQuitty & Smith, 2007). Kolb found that learning occurs by grasping an experience and then transforming that experience; reflection on the experience often occurs with the help of a facilitator (1984). Some factors that facilitate experiential learning include: external intervention from a teacher; inner motivation of the student; and involvement of a random third party (Fowler, 2007). When these factors are properly in place, experiential learning can occur at optimum levels. Research by McGill and Warner Weis (1989) found that experiential learning "enables the discovery of possibilities that may not be evident from direct experience alone" (p. 248). Research also indicates that when experiential learning is coupled with inquiry-based learning, youth programs can yield positive impacts and meaning (Skelton, Seevers, Dormody & Hodnett, 2012). Additionally, the essential elements used in 4-H youth development programs can provide a quality framework for STEM education, ensuring student satisfaction and success, in mastery, independence, belonging, and generosity categories (National 4-H Council, 2009; Sallee & Peek, 2014).

Methodology

The purpose of this study was to assess changes in 4-H youth knowledge, interest, and career ambitions in STEM and natural resource content as a result of participation in a one-day camp. To accomplish this, the following objectives were developed: 1.) Participants will increase their hands-on knowledge, interest, and career ambitions in STEM. 2.) Participants will engage in experiential and inquiry based activities to link STEM and agricultural concepts. In order to measure participants' changes, a pre- and post-test design was implemented using a ten statement five-point Likert-scale. The instruments were assessed by a panel of STEM faculty for validity and readability. Agricultural education students in an extension course designed the interactive, inquiry-based science camp using STEM and natural resource curriculum. The pre-test/post-test was administered to 50/47 4-H youth ages 9-13 from three counties with a 100% response rate. Descriptive statistics and t-tests were utilized to analyze data.

Results/Findings

Overall, participants increased their knowledge, interest, and career aspirations in STEM and natural resource concepts as a result of attending the 4-H camp. The mean score for the understanding of STEM and natural resource concepts increased from M= 3.74 (*SD*= 0.78) to M=4.51 (*SD*=0.28) and M=4.02 (*SD*=0.82) to 4.30 (*SD*=0.95), respectively. Interest in STEM topics increased the following percentages from pre-to post-test: science (+4%), mathematics (+8%), technology (+8%), engineering (+19.6%), and agriculture (+14.5%). Participants agreed that active participation in workshop activities improved their ability to remember STEM concepts (Mpre= 3.96 to Mpost=4.28). Prior to the camp, 21 participants had considered a career in the natural resources or STEM field with an overall mean of 3.38; after the camp, 34 participants would consider a future STEM career and the overall mean increased to 4.15 (+0.77). When asked if STEM concepts were integrated into agriculture at the beginning of the camp, 72% (n=34) agreed; by the end of the camp, 85% (n=39) agreed. Forty-eight percent (n=24) of participants had been involved in a STEM or natural resources 4H project previously. Interest in developing a STEM 4H project in the future increased to 59% (+11%) after participation in the camp. The overall mean for the statement, I am interested in STEM and natural resource topics, increased from Mpre= 4.06 to Mpost=4.20. The largest increase was seen in the participants' desire to pursue a career in a STEM related field in college which changed from 62% on the pre-test to 91% on the post-test (+29%). A t-test was conducted and revealed a significant difference between the pre-test and post-test mean scores in the understanding of STEM concepts (n=50, t=-5.42, p<.001), career interest in STEM or natural resources (n=50, t=-4.21, p<.001), and STEM concepts are integrated into agriculture (n=50, t= -2.67, p<.05).

Conclusions/Recommendations/Implications

It is essential that youth are being educated on agricultural and STEM concepts in meaningful, engaged environments to meet the future demands in agriculture. Indicative of Kolb's (1984) theory, a primary conclusion was that youth did increase interest and knowledge in STEM concepts through a one-day, experiential, inquiry-based science camp. Largest increases were seen in interest in engineering and agricultural concepts, as well as the desire to pursue a career in a STEM related field. This confirms the importance of early exposure to STEM and agricultural concepts to influence future decisions. Educators must continue to build on these experiences in all contexts to show the connections to agriculture and potential careers. 4H, FFA, and science projects offer unique avenues to engage youth in applying these concepts in a realistic setting. Camps can also serve as effective recruitment events for colleges as results indicated significant increases in career ambitions. For future research, a deeper analysis of youth perceptions of agriculture versus comprehension of STEM concepts would provide more detail to assess the effectiveness of experiential learning opportunities.

References

Association of Public and Land-Grant Universities. (2009). *Human capacity development: The road to global competitiveness and leadership in food, agriculture, natural resources, and related sciences (FANRRS).* Association of Public and Land-Grant Universities: Washington, D.C.

Dillivan, K, D.& Dillivan, M.N. (2014). Student interest in STEM disciplines: Results from a summer day camp. *Journal of Extension*, *52*(1), Article 1RIB5. Retrieved from: http://www.joe.org/joe/2014february/rb5.php

Doerfert, D. L. (Ed.). (2011). *National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015.* Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications.

Enfield, R.P., Schmitt-McQuitty, L., & Smith, M. (2007). The development and evaluation of experiential learning workshops for 4-H volunteers. *Journal of Extension, 4*5(1), Article 1FEA2. Retrieved from: http://www.joe.org/joe/2007february/a2.php

Fowler, J. (2007). Experiential learning and its facilitation. *Nurse Education Today*, 28, 427-433.

Goecker, A.D., Smith, A. D., Smith E., & Goetz, R. (2010). *Employment opportunities for college graduates in food renewable energy and the environment.* United States Department of Agriculture. Retrieved from: http://www.ag.purdue.edu/usda/employment/pages/default.aspx.

Heck, K. E., Carlos, R.M., Barnett, C., and Smith, M.H. (2012). 4-H participation and science interest in youth. *Journal of Extension, 50*(2), Article 2FEA5. Retrieved from:http://www.joe.org/joe/2012april/a5.php.

Kolb, D. (1984). *Experiential learning*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

McGill, I. & Weis, W. (1989). Continuing the dialogue: New possibilities for experiential learning. In Weil, S. & McGill, I. (Eds.), *Making sense of experiential learning.* Milton Keynes: The Society for Research into Higher Education and Open University Press.

Mielke, M. & Sanzone, J. (2012, February). *4-H science evaluation year 3 implementation study.* Policy Studies Associates: Washington, DC.

National 4-H Council. (2009). *Essential elements of 4-H youth development programs.* Retrieved from http://www.4-h.org/resource-library/professional-development-learning/4-h-youth-development/youth-development/essential-elements/

Pedaste, M., Marots, M., Siiman, L.A., Jong, T., Risen, S.A., Kamp, E.T., Manoli, C.C., Zacharia, Z.C., & Tsourlidaki, E. (2015). Phases of inquiry-based learning: Definitions and the inquiry cycle. *Elsevier,* 14, 47-61.

Sallee, J. & Peek, G.G. (2014). Fitting the framework: The STEM institute and the 4-H essential elements. *Journal of Extension, 52*(2), Article 2FEA8. Retrieved from: http://www.joe.org/joe/2014april/a8.php

Skelton, P., Seevers, B., Dormody, T., Hodnett, F. (2012). A conceptual process model for improving youth science comprehension. *Journal of Extension, 50*(3), Article 3IAW1. Retrieved from: http://www.joe.org/joe/2014april/a8.php

USDA. (2015, May 11). *One of the best fields for new college graduates? Agriculture* (News Release No. 01335.15). Washington, DC: Office of Communications.

Culture Shock! Exploring the Family-Supportive Work Culture of Agriculture Teachers

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Culture Shock! Exploring the Family-Supportive Work Culture of Agriculture Teachers

Introduction/ Need for Research

One of the biggest challenges facing the agricultural education profession today is the lack of qualified agriculture teachers necessary to meet demand (Myers, Dyer, & Washburn, 2005). Recruitment of more teachers into the profession as well as retaining those already in the profession will help solve the teacher shortage problem. In an effort to establish a "sufficient scientific and professional workforce that addresses the challenges of the 21st century" (Doerfert, 2011, p. 9), this research focused on the retention of existing agriculture teachers.

One specific challenge facing agriculture teachers in the 21st century is the need for teachers to find a balance between work and family roles (Foster, 2001; Murray, Flowers, Croom, & Wilson, 2011). One barrier to successfully balancing work and family roles is the lack of work-family culture. Work-family culture is defined as the extent to which an organization supports and values employees' work and family lives (Thompson, Beauvais, and Lyness, 1999, p. 394). Research suggests that a supportive work-family culture is associated with less intention to leave the organization, less work-family conflict, and greater overall organizational commitment (Grover & Crooker, 1995; Thompson et al., 1999). Therefore, exploring the work-family culture of agriculture teachers may be a salient endeavor in addressing and understanding agriculture teacher turnover and retention. However, a dearth of literature about the work-family culture of agriculture teachers exists. This study sought to address this gap in the literature by utilizing a national sample of teachers to describe the work-family culture within agricultural education.

Theoretical and Conceptual Framework

The Conservation of Resources (COR) model offers a theoretical lens for understanding the interface between work and family domains (Hobfoll, 1989). COR posits that individuals are motivated to acquire and maintain resources in an effort to cope with the strain of trying to balance between multiple roles (Grandey & Cropanzano, 1999). Accordingly, we view work-family culture as a coping resource for teachers trying to balance work and family roles. Thomas and Ganster (1995) described the elements of work-family culture as: family-supportive policies (e.g., benefits), family-supportive supervisors, and family-supportive organizations. Considering the theoretical foundations of this study, we conceptualize the work-family culture of agriculture teachers as resources consisting of family supportive policies, family-supportive administrators, and overall family-supportive organizations (agricultural education profession and workplace).

Methodology

The target population for this study consisted of all secondary agriculture teachers in the United States during the 2014-2015 school year and who self-identified as a participant in the family role. We obtained a simple random sample of agriculture teachers from the National FFA Organization (n = 667). Surveys were distributed electronically to participants, which yielded a usable response rate of 35% (n = 234). As part of a larger study, the instrument was designed to elicit respondents' perceptions of the work-family culture in which they were employed. Participants were asked to respond (agree or disagree) to four statements indicating whether or not they perceived their work culture to be family friendly. The four statements, adopted from Harrington, Deusen, and Humberd, (2011) included "my administration really cares about the effects that work demands have on my personal life" (family-supportive administrators), "my workplace has a family supportive culture" (family-supportive workplace), "the school and district policies where I work support teachers that have family obligations" (family-supportive policies), and "the agriculture teaching profession has a family supportive culture (family-supportive agricultural education profession).

Results/Findings

The purpose of this study was to describe the work-family culture of agriculture teachers in the United States. Figure 1 provides a breakdown of the respondents' perceptions of the work-family culture in which they were employed. Overall, agriculture teachers perceived their work culture to be family friendly with all four areas indicating more agreement than disagreement.

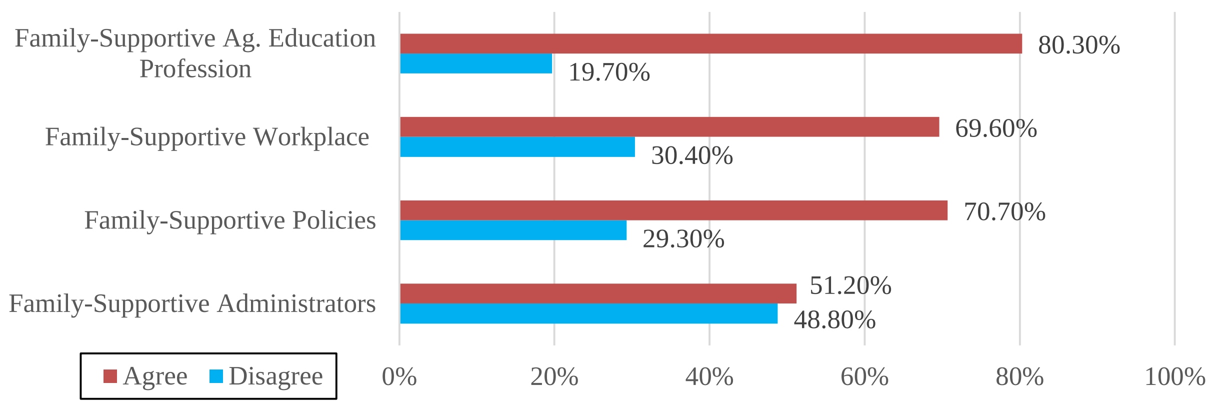

Figure 1. Perceived work-family culture of agriculture teachers in the United States.

Conclusions

Although these results are based on only four questions, they are encouraging for the agricultural education profession. Family-supportive administrators was the component of the workplace culture which teachers perceived to be the least supportive of family. This finding is consistent with research indicating a challenge agriculture teachers face is lack of administrative support (Boone & Boone, 2007). This finding suggests the need to broaden the definition of administrative support to include support of teachers' family needs as well.

Implications/Recommendations/Impact on Profession

We recommend research like this be shared with so they strive to improve the work-family culture within their schools. Additionally, we recommend more research that includes administrators and their perceptions of the work-family culture. Finally, qualitative research that explores the culture within agricultural education, identifying practices and artifacts that enable and discourage a family-friendly workplace might be helpful. This research can have a profound impact on the profession in our effects to address the issues of teacher attrition and retention.

References

Boone, H. N., & Boone, D. A. (2007). Problems faced by high school agricultural education teachers. *Journal of Agricultural Education*, *48*(2), 36-45. doi:10.5032/jae.2009.01021

Doerfert, D. L. (Ed.) (2011). *National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015.* Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications. Retrieved from: http://aaaeonline.org/National-Research-Agenda

Foster, B. B. (2001). Choices: A dilemma of women agricultural education teachers. *Journal of Agricultural Education*, *42*(3), 1-10. doi:10.5032/jae.2001.03001

Grandey, A., & Cropanzano, R. (1999). The conservation of resources model applied to work–family conflict and strain. *Journal of Vocational Behavior*, *54*(2), 350-370. doi: 10.1006/jvbe.1998.1666

Grover, S. L., & Crooker, K. J. (1995). Who appreciates family-responsive human resource policies: The impact of family-friendly policies on the organizational attachment of parents and non-parents. *Personnel Psychology*, *48*(2), 271-288. doi: 10.1111/j.1744-6570.1995.tb01757.x

Harrington, B., Van Deuson, F., & Humberd, B. (2011). *The new dad: Caring, committed and conflicted.* A report from Boston College Center for Work and Family. Retrieved from http://www.bc.edu/content/dam/files/centers/cwf/pdf/FH-Study-Web-2.pdf

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, *44*(3), 513-524. doi: 10.1037/0003-066X.44.3.513

Murray, K., Flowers, J., Croom, B., & Wilson, B. (2011). The agricultural teacher's struggle for balance between career and family. *Journal of Agricultural Education*, *52*(2), 107-117. doi: 10.5032/jae.2011.02107

Myers, B. E., Dyer, J. E., & Washburn, S. G. (2005). Problems facing beginning agriculture teachers. *Journal of Agricultural Education*, *46*(3), 47-55. doi:10.5032/jae.2005.03047

Thomas, L. T., & Ganster, D. C. (1995). Impact of family-supportive work variables on work-family conflict and strain: a control perspective. *Journal of Applied Psychology*, *80*(1), 6-15. doi: 10.1037/0021-9010.80.1.6

Thompson, C. A., Beauvais, L. L., & Lyness, K. S. (1999). When work–family benefits are not enough: The influence of work–family culture on benefit utilization, organizational attachment, and work–family conflict. *Journal of Vocational Behavior*, *54*(3), 392-415. doi: jvbe.1998.1681

Measuring and Comparing Student's Knowledge on Genetically Modified Organisms

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Measuring and Comparing Student's Knowledge on Genetically Modified Organisms

Introduction and Need for this Study

Consumer knowledge and perception of agricultural issues has been a significant issue in agriculture (Doerfert, 2011; Miller & Conko, 2004; Murphy, 2007; National Research Council, 1988). During this time consumers have become increasingly critical of industrial agriculture practices. For instance, more emphasis is being put on sustainability and caring for the environment. An argument from many agriculturalists is that the information consumers receive about agriculture is inaccurate and/or negative. In short, it is the lack of consumer knowledge or accurate knowledge which leads to their distrust of industrial agriculture. This situation has placed a greater emphasis on agricultural literacy (Doerfert, 2011).

Framework on Genetically Modified Organism

An example of an issue which polarizes people around agriculture is genetically modified organisms (GMOs). Some consumers and organizations feel that GMOs are detrimental to the small-scale farmer, genetic diversity, and the overall health of the ecosystem (Rodale, 2010). Conversely, some people and groups support GMOs because they think that GMOs help feed a growing world population (Conway, 2012; Borlaug, 2012; Miller & Conko, 2004). Agriculturalists argue that consumers need factual truth regarding GMOs in making informed economic and policy decisions (Doerfert, 2011). This would require educational programming and public information campaigns; however, a lingering question remains before these campaigns can begin. How much do consumers actually know about GMOs? The purpose of this exploratory study was to measure and compare high school agriculture students' and college of agriculture undergraduates' level of knowledge about GMOs. We wanted to examine our own students' knowledge base, which will help us develop more appropriate outreach programs.

Methods

This study was a descriptive quantitative study that measured high school agriculture students' and college of agriculture undergraduates' responses relating to their existing knowledge of GMOs. The study was given to [Region of the State] high school agriculture students and [University] college of agriculture undergraduates. The 57 high school students surveyed ranged from freshmen to seniors and demographically were mostly white and middle class. The 27 undergraduates had a wide-range of majors and were generally white, middle-class, and between 18 and 23 years old. The instrument consisted of one open-ended question and ten multiple choice questions. The design of the open-ended question allowed participants to answer a variety of ways and still be correct. The open-ended question was scored on a six-point scale which examined how the accuracy of the stated argument compared to arguments developed by the panel of experts. This was scored as compatible (C) or incompatible (I) to the experts' argument. Next, the amount of supporting evidence provided for participants' argument was scored as either being sketchy (S) or elaborate (E) in detail. Thus a participant could receive a rating for their open-ended question which was recorded as compatible elaborate (CE), compatible sketchy (CS), incompatible elaborate (IE), or incompatible sketchy (IS). A participant could provide an argument which was completely unrelated to the topic (scored as a U) or provide no argument or evidence (N). This coding approached was developed by Hess and Trexler (2011). The multiple choice questions were derived from United States Department of Agriculture fact sheets and each question had only one correct answer. Answers were graded against a rubric and grading scales. The coding process was done by a research team. Validity of research was also maintained by having a panel of GMO and education experts review the open-ended questions, the rubric for the open-ended question, and multiple choice questions. The multiple choice questions were reviewed by the same panel experts who reviewed the open-ended question. The study was approved by our Institutional Review Board app. We analyzed the data using basic frequency techniques.

Findings

The high school students' open-ended responses were most frequently at the incompatible elaborate level, meaning they had some knowledge about GMOs, but struggled to develop a factual argument. An example response included, "It has helped them improve production because the engineering production will help provide more production." The undergraduate open-ended response was most frequently at the compatible sketchy level, which means they provided accurate arguments about GMO, but struggled to provide evidence to support their argument. An example of a response included: "GMOs help the farmers by giving the farmer seeds that are drought resistance, pesticide resistance, etc. It increases the yield as well." Multiple choice responses were varied across both high school and undergraduate studies. The high school students had an average of 30% (n=57) of the questions answered correctly while the undergraduate students had an average of 47% (n=27) answers correct.

Conclusion

This study should be analyzed with its limitations in mind, which included limited frequency techniques, small population size, and a non-randomized sample. The undergraduate college of agriculture students had a greater level of knowledge about GMOs compared to high school agriculture students; although the level was still significantly low at 47 %. The undergraduates were able to articulate quality arguments about GMOs in the open ended question. The high school students scored lower in the multiple choice section with 30%. They also provided less articulate open ended reposes compared to the undergraduate. These scores for high school students generally align with Pense and Leising's (2004) findings about 12th graders general agriculture knowledge.

Implications and Recommendations

The findings from this study pose a possible significant issue for agricultural literacy. We found that our undergraduates understood GMOs if we loosely conceptualized the open-ended question as a form of understanding. However, the multiple choice questions, which reflected the overall knowledge level of GMOs, seemed low. Could the undergraduates at our institution be as unknowledgeable about GMOs as the general public? Research is needed to find baseline levels of knowledge and understanding of GMOs in order to accurately compare these populations. Nonetheless, we found that these undergraduate and high school agriculture students' knowledge level of agriculture was low. This would support the concept of training in GMO related curriculums at both the high school and undergraduate level in agriculture. Additional research should be conducted related to other controversial issues in agriculture to confirm findings.

References

Borlaug, N. E. (2000). Ending world hunger. The promise of biotechnology and the threat of antiscience zealotry. *Plant Physiology, 124*(2), 487-490. doi: 10.1104/pp.124.2.487

Conway, G. (2012). *One billion hungry: Can we feed the world?* Ithaca, NY: Comstock Publishing Associates.

Doerfert, D. L. (Ed.) (2011). *National research agenda: American Association for Agricultural Education's research priority areas for 2011-2015*. Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications.

Hess, A. J., & Trexler, C. J. (2011). A qualitative study of agricultural literacy in urban youth: Understanding for democratic participation in renewing the agri-food system. *Journal of Agricultural Education, 52*(2), 151-162. doi: 10.5032/jae.2011.04001

Miller, H. I. & Conko, G. (2004). *The Frankenfood myth: How protest and politics threaten the biotech revolution*. Westport, CN: Praeger.

Murphy, D. (2007). *Plant breeding and biotechnology: Societal context and the future of agriculture*. New York: Cambridge University Press.

National Research Council. (1988). *Understanding agriculture: New directions for education*. Washington: National Academy.

Pense, S. L., & Leising, J. G. (2004). As assessment of food and fiber systems knowledge in selected Oklahoma high schools. *Journal of Agricultural Education*, *45*(3), 86-96. doi: 10.5032/jae.2004.03086

Rodale, M. (2010). *Organic manifesto: How organic farming can heal our planet, feed the world, and keep us safe*. New York: Rodale.

Visualizing the Analysis: Using Infographics to Augment Critical Thinking Skills

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Visualizing the Analysis: Using Infographics to Augment Critical Thinking Skills

Introduction

Critical thinking has been noted as an important outcome of an undergraduate education at Texas A&M University (Texas A&M University, 2010) as well as an important component of life-long learning and professional success (Halpern, 1998). Yet, students struggle to develop critical thinking skills as part of their undergraduate experience. Critical thinking components must be intentionally integrated into course content (Beyer, 1987) for students to foster and develop critical thinking skills. Therefore, an assignment intentionally designed to increase students' analytical and critical thinking skills was integrated into a sophomore-level course as an agricultural issue analysis visually presented using an infographic.

How it works

Before beginning the agricultural issue assignment, students completed the communication style assessment (Hartman & McCambridge, 2010, 2011) and were exposed to Paul & Elder's (2014) critical thinking components. The communication style assessment provided the students with a profile of how they communicate and effectively interact with others. Then, during week six, the instructor spent three, 50-minute class periods outlining critical thinking components and discussing research. First, the students learned how to find and analyze credible and reliable information. Second, the instructor provided an interactive lecture based on thinking critically about feeding nine billion people by 2050. Students analyzed the issue using Paul and Elder's (2014) critical thinking components. Third, the students developed their ideas about feeding the world and thought about the issue using the scaffolding process, which included drawing and discussing their ideas with a classmate (MacMeekin, 2013).

Week 10 the instructor assigned the agricultural issue analysis and placed the students into groups based on their communication style. The 10 groups included heterogeneous and homogeneous groupings, and each group had five members. The agricultural issue assignment included four steps:

1. **Identify an agricultural issue and target audience:** Students identified an issue and described the target audience, which was the students in the course. The instructor did not turn down any issues because the importance of the issue was up to the group. The students provided a description of the audience's demographics and psychographics along with a statement about their issue, which included how they identified their issue. The audience analysis accounted for 20% of the students' grade.
2. **Analyze an agricultural issue:** Students included facts and evidence to support or refute their issue and creatively designed an infographic that provided graphics and text that answered critical thinking questions (Paul & Elder, 2014; Stedman, 2015) related to
    - Interpretation (categorize, clarify, decode significance)
    - Analysis (examine ideas, analyze arguments and assumptions)
    - Evaluation (assess claims and arguments, assign value)
    - Inference (find alternatives, draw conclusions, make recommendations)

    The critical thinking involved in the analysis was the most intensive part of the assignment because students struggled with creating precise infographics that were not text heavy. They struggled with presenting their analysis as an infographic and not as a written research paper. Many of the groups had several iterations of their infographics, but all of them were satisfied with their projects at the end. The issue analysis accounted for 30% of the students' grade.

3. **Discuss an agricultural issue:** Each group presented its issue and analysis, which included the infographic and the information collected as part of the research process. Presentations were 12 minutes, seven minutes for presentation and five minutes for questions, and accounted for 25% of the students' grade. Each group spoke from their infographic and developed two questions designed to create discussion about their issue.
4. **Participation in discussions:** In addition to the 12-minute presentation, students were required to attend class and participate in their classmates' presentations. Participation was worth 25% of the students' grade.

Results to Date/Implications

The assignment challenged the students because, to effectively present an issue using an infographic, they had to critically analyze their issue. In reflection, students noted that the agricultural issues assignment required them to think critically, which helped them to see the issue from different perspectives. Students' ability to see an issue from various angles was evident during the presentations.

However, while working on the assignments, students faced a variety of challenges. Although they like to consume information in infographic format, many of them struggled to develop their own infographics using factual, concise information. When faced with group challenges, they relied on the communication style assessment to help them interrupt their group members' behaviors and communication actions. The assessment helped them to understand how to work with others and how to accept others in working environments such as the ones they were in. Another real struggle for the groups was understanding that it is OK if more than one answer exists—realizing that every issue does not have a textbook answer was tough for each group.

The students enjoyed creating discussion questions and noted that it was one of the most difficult parts of the assignment. They believed they were more educated about their issues and believed they could provide more accurate information related to their issues. At the end of the assignment, students anecdotally noted that they had never been taught how to think critically, that they overestimated the assignment and the critical thinking process, and that thinking critically was not as hard as they had made it out to be. The students' infographics were published on the Department's social media platforms as a way to participate in agricultural information dissemination and to assist the social media coordinator with content curation.

Future plans

The instructor plans to continue using the assignment to intentionally integrate critical thinking components into the course content but not without the following adjustments:

- Place students into heterogeneous groups of three.
- Have longer presentations at the end of the semester because many of the groups had engaging discussion questions that sparked conversation.
- Integrate a pre- and post-assessment of critical thinking.

Cost/Resources needed

The resources included time and money. First, one week of the course was devoted to teaching students how to think critically and conduct research related to an agricultural issue. Second, the program purchased a $39.99 subscription to Pikochart, so the students could create the infographics. A free version of Piktochart is available, but the free version does not allow users to print high resolution graphics. Third, four class periods at the end of the semester were devoted to issues presentations.

References

Beyer, B. K. (1987). *Practical strategies for the teaching of thinking*. Newton, MA: Allyn and Bacon.

Halpern, D. F. (1998). Teaching critical thinking for transfer across domains: Disposition, skills, structure training, and metacognitive monitoring. *American Psychologist*, *53*(4), 449. doi: 10.1037/0003-066X.53.4.449

Hartman, J. L., & McCambridge, J. A. (2010). *The communication style survey (rev.)*. Unpublished survey instrument.

Hartman, J. L., & McCambridge, J. (2011). Optimizing millennials' communication styles. *Business Communication Quarterly, 74*(1), 22–44.

Texas A&M University. (2010). *University Learning Outcomes for Undergraduates.* Retrieved from Texas A&M University, Office of Office of the Provost and Executive Vice President for Academic Affairs website: http://president.tamu.edu/documents/StudentLearningOutcomesWebSite.pdf

MacMeekin, M. (2013, October 22). Scaffolding like an ant — a simple scaffolding example [Web log post]. Retrieved from https://anethicalisland.wordpress.com/2013/10/22/scaffold-like-an-ant-a-simple-scaffolding-example/

Paul, R., & Elder, L. (2014). *The miniature guide to critical thinking: Concepts & tools* (7th ed.). Foundation Critical Thinking.

Stedman, N. (2015). Instruction for the future of thinking: Building capacity for critical thinking in your students [PowerPoint slides].

Ag In A Bag: An Elementary Agricultural Education Program

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Ag In A Bag: An Elementary Agricultural Education Program

Introduction

Steak comes from the grocery store not a cow, lobster comes from Red Lobster not the ocean, and sometimes fruits and vegetables come from a plant. Many children in the 21st century are illiterate when it comes to food and where it comes from. They do not know about agriculture and how agriculture is the only way they have food and clothing. Many research articles quote the definition of Agriculture but according to the Merriam-Webster Dictionary Agriculture is defined as the science, art, and business of cultivating soil, producing crops, and raising livestock. The reason this definition is presented in the introduction of most research articles is because the definition implies that all agriculture is farming. In the 21st century "Americans as a whole, were at least two generations removed from the farm and did not understand even the most rudimentary of processes, challenges, and risks that farmers and the agricultural industry worked with and met head-on every day" (National Agriculture in the Classroom, 2011a, p. 1). This fact presented the need for more agriculture education in the public school system. The question now was how to implement material into schools that teachers with little to no agriculture knowledge can implement. In 1982 the United States Department of Agriculture (USDA) established a program called Agriculture in the Classroom that was created to educate students about Agriculture. After 1982 research continued to be done to determine the agricultural knowledge of America. "Horn and Vining (1986) found that school age children in Kansas knew little about the food and fiber system". Bowers and Kohl (1986) found that elementary school teachers rate their knowledge of agriculture as low" (Terry, Herring & Larke, 1992). The need for agriculture education was apparent beginning at the elementary level. Agriculture education is becoming a thing of the past and young children are paying the price. I am a kindergarten teacher in a small rural school where farming and ranching is the life for our community. Many of my students know that beef is from a cow that was raised in a pasture. They know their pork chops are from the hog that was slaughtered after the county fair, but not all of them know that cotton comes from a plant. There is a need for agriculture education in elementary schools and what better way to do that than through a Texas Essential Knowledge and Skills (TEKS) aligned education program.

Methodology

"*Ag In A Bag*" is a bag that contains a children book about an agriculture topic, lesson plans, vocabulary picture cards, at least two student activities and pencils. The intent of this lesson is to be taught in a one thirty to forty five minute lesson block. *Ag In A Bag* is also complemented nicely by a school hosted Agriculture day but can be a stand alone program as well. The Pre-K bag is based around the children's book *My First Farm*. Before the lesson is taught the teacher is asked to go over the picture vocabulary cards to pre-teach some of the unfamiliar words that the book may present. This is intended to help the students gain a deeper understanding of the content. During the reading of the book the students will look for the answers to predetermined questions, such as, What are butter and cheese made from? After all the questions have been answered and the book is finished the students than complete a journal prompt to show what they learned from the book. The Kindergarten bag follows closely with the Pre-K bag except their lesson is based around the book *Apple Farmer Annie* by Monica

Wellington. The first through third grade bags contain a pre- and post-test assessment along with a journal prompt. Since these grades are able to test and read independently I felt a pre- and post-test could show a better prediction of the amount of knowledge they learned from the program. The first grade bag is based around the book *Where Does Food Come From?* By Shelley Rotner and Gary Goss. Second grades topic was *From Seed to Plant* by Gail Gibbons and third grades topic was *Dirt* by Steve Tomecek.

Results to date/Implications

The *Ag In A Bag* program was a success in the first and second trial runs. The first trail run was done in the spring of 2013. The purpose of this implementation of the program was to see the likely hood of teachers participating in the program. *Ag In A Bag* was given to 5 teachers ranging from Pre-K to 3rd grade. All of the teachers participated in presenting the lesson to their class and said they would participate in the program again. In 2014 *Ag In A Bag* was given to these same teachers but with more content. The teachers presented the lesson to the students, data was collected through pre and post test and teacher surveys. All grades showed progress on their knowledge gained through the program. Therefor adding in the overall goal and that is agricultural knowledge at the elementary level.

Future Plans

At this time *Ag In A Bag* has only been implemented on one elementary campus. The goal for 2015 is to implement the program on the same campus and add another. The goal for *Ag In A Bag* is to get the idea out there to High School FFA programs and than have their students create their own versions. This could be a great project for an Agricultural Communications class or even an Introduction to Agricultural class. I plan to have multiple copies of Ag In A Bag on hand so that I can distribute the program where it is needed. The how plan is by 2020 to have 20 or more elementary classrooms teaching a lesson on Agricultural education to their students.

Costs

The cost for *Ag In A Bag* is variable depending on type of implementation. An agricultural classroom using school resources could create and implement this program idea for free. The most that you could spend would be $70.00 and this would be if you bought all the books off the internet, and the bags and pencils from oriental trading. The idea of this project is use your school resources that have already been purchased eliminating any outside costs. When developing this program I found my children's books in their own classroom libraries as well as in the school library. This leaves the program very cost efficient to implement all you need is teacher support.

References

Be ag smart lesson plans. (n.d.). Retrieved from http://www.beagsmart.org/ag-in-the-classroom/lesson

Bellah, K. A., & Dyer, J. E. (2009). Attitudes and stages of concern of elementary teachers toward agriculture as a context for teaching across grade level content area standards. *Journal of Agricultural Education*, *50*(2), 12-25. Retrieved from http://www.jae-online.org/attachments/article/65/Bellah_Dyer_50_2_12-25.pdf

Bowers, G. A. & Kohn, D. M. (1986). *A study of 244 fourth grade teachers in Virginia for application to agriculture in the classroom*. Report prepared for an honors seminar. Virginia Polytechnic Institute and State University, Blacksburg, VA.

Hess, A. J., & Trexler, C. J. (2011). A qualitative study of agricultural literacy in urban youth: What do elementary students understand about the agri–food system?. *Journal of Agricultural Education*,*52*(4), 1-12. Retrieved from http://www.jae-online.org/attachments/article/1575/52.4.1 Hess and Trexler.pdf

Horn, J. & Vining, B. (1986). *An assessment of students' knowledge of Agriculture*. Manhattan, KS: Center of Extended Services and Studies, College of Education, Kansas State University.

National Agriculture in the Classroom Organization. (2011a). *Agriculture in the Classroom White Paper*. Retrieved from http://http://www.agclassroom.org/naitc/pdf/white_paper.pdf

Terry, R., Herring, D. R., & Larke, A. (1992). Assistance needed for elementary teachers in Texas to implement programs of agriculture literacy. *Journal of Agricultural Education*, *33*(2), 51-60. Retrieved from http://www.jae-online.org/attachments/article/726/Terry, R_et.al_Vol33_2_51-60.pdf

Harvesting Connections: The Benefits of a Student Designed Agricultural Industry Tour

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Harvesting Connections: The Benefits of a Student Designed Agricultural Industry Tour

Introduction

An industry tour completely planned and organized by agriculture leadership students has been a huge success within our college. The college-wide industry tour has grown remarkably over the recent years with support from the college, industry, and sponsors. Additionally, the tour provides a platform in which everyone involved can benefit through industry connections, networking, and exposure to the many areas within the agricultural industry. Students appreciate the opportunity to experience production, processing and manufacturing of crops, animals, services and value added products. This innovative poster showcases the importance of taking post-secondary agriculture students off campus and immersing them with agriculture business and industry experiences.

A college-wide, student-led agricultural industry tour is very rare. We reviewed available literature and could not find another example of a student planned and led agriculture industry tour that is open and inclusive of all majors within the college of agriculture. Industry tours, typically provided by specific clubs, are common with colleges of agriculture; however, they tend to be focused specifically on one sector of agriculture, catering to a single major.

Background/Need for the Innovation

The first agricultural industry tour began in 1995 and was coordinated by a student leader in the college of agricultural sciences. This model has provided long lasting benefit to our students for the last 20 years. A prior department head in Agricultural Education identified several benefits of the tour including enhancing the image of the college and building strong industry connections. He also highlighted the many positive responses from students and individuals from industry who participated in previous tours.

Students who participated in the industry tour benefited by experiencing new sectors of agriculture they had not previously encountered. Participants appreciated that the tour lends itself to a wide segment of agriculture and claim their understanding on the industry has expanded. Since the inception of the tour, the growth, support, and complexity have improved, making it a model in collegiate agritourism.

Throughout the previous decade, there have been a considerable number of studies concerning agritourism. The vast majority of research has focused on the benefits of agritourism to the producer and local economy that stem from diversification and re-purposing of agricultural land. A review of the literature found no studies concerning the impact that agricultural industry tours have on post-secondary students. Additionally, we found only one study dedicated to a high-impact field experience. Odom, Shehane, Moore, & McKim (2014) sought to describe students' critical thinking skills at the completion of a course, which contained a high-impact experiential learning trip. As a result of their findings, Odom and colleagues recommended further research concerning students' involvement in experiential learning opportunities, and their affect on students' critical thinking skills. It has been well documented that experiential learning is a fundamental part of agricultural education, dating back to its early beginnings (Baker, Brown, Blackburn, & Robinson, 2014; Knobloch, 2003; Roberts, 2006). According to Knobloch (2003), “Authentic learning reflects the type of cognitive experiences that occur in real life” (p. 23). An agricultural industry tour offers post-secondary students the opportunity for interaction and exposure to various aspects of the agricultural industry, and provides insight into work environments and current agricultural practices. Designed correctly, an agricultural industry tour provides students with at least three of the four components of Kolb’s (1984) experiential learning theory, *concrete experience* and *reflective observation*.

How it Works

The student leadership council within the college of agriculture sciences at Oregon State University has facilitated the industry tour since its inception. The vice-president of the leadership council has the primary responsibility to plan and execute the industry tour with assistance of the officer team. The council creates attractive advertising materials and opportunities (i.e. posters, book markers, promotional you-tube video and personal club visits). The student-led council establishes the open and closing date for application submissions, followed by a screening of applications to select the final attendees. The council holds an initial meeting with attendees one week prior to the tour departure to preview student expectations, tour itinerary, and learning outcomes. The goal of the council is to provide purpose and create relevancy for the attendees through verbal and written reflections throughout the tour.

Costs and Resources Needed

The 2015 industry tour cost the participants $50, which included two hotel nights, use of charter bus, and most meals. The remaining $315 for each participant was subsidized by the student leadership council budget. The vice president worked on securing agricultural industry sponsorships to lower overall cost and coordinated meals to include industry participation and increased networking opportunities for students.

Results

The current Executive Director for Oregon State Ag in the Classroom, and a recent college of agriculture graduate, stated:

> I had the opportunity to participate in the industry tour all four years as a college student. As a tour participant, I was excited not only at the opportunity to get to know other students in the college of agricultural sciences, but also to expand my knowledge and familiarity with agriculture. On the tour, we were able to witness first-hand, a variety of different careers, practices and aspects of the Oregon State agricultural industry. …I am able to use what I witnessed on the tours and, as a result, relate better to topics that I would have otherwise been unfamiliar. The trips were a highlight of my collegiate club involvement.” (Jessica Budge, personal communication, December 20, 2014)

Future Plans

Our future plans for the industry tour are to maintain the impact and value of this college-wide experience while increasing the exposure and importance of this tour for students, industry collaborators, and the profession of agriculture. We will continue to develop this high impact experience which shapes the career development of students and promotes lifelong learning.

References

Baker, M. A., Brown, N. R., Blackburn, J. J., & Robinson, J. S. (2014). Determining the effects that the order of abstraction and type of reflection have on content knowledge when teaching experientially: An exploratory experiment. *Journal of Agricultural Education, 55*(2), 106-119. doi: 10.5032/jae.2014.02106

Knobloch, N. A. (2003). Is experiential learning authentic? *Journal of Agricultural Education, 44*(4), 23-34. doi: 10.5032/jae. 2003.04022

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Upper Saddle River, NJ: Prentice Hall.

Odom, S. F., Shehane, M., Moore, L. L., & McKim, B. (2014). An analysis of a high impact field experience in agriculture: documenting critical thinking skills through reflection. *NACTA Journal*, *58*(3), 216-222.

Roberts, T. G. (2006). A philosophical examination of experiential learning for agricultural educators. *Journal of Agricultural Education*, *47*(1), 17-29. doi: 10.5032/jae.006.01017

Creating an Agricultural Communications Service Center

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Creating an Agricultural Communications Service Center

Introduction

The job market for college graduates is competitive. Experience gained through internships is a key-attribute that sets an entry-level applicant apart from others for prospective employers (Gault, Redington & Schlager, 2000). Internships allow students to gain a self-directed mindset in preparation for the workforce (Pennington, 2004) while further developing skills within their profession. Undergraduates with internship experience gain yet another benefit to preferential career placement, including obtaining a career position faster than non-intern undergraduates, increased monetary compensation, and greater overall job satisfaction (Gault, Redington & Schlager, 2000).

A majority of internships do not systematically integrate a formal learning experience hindering interns from full engagement in "real-world problem solving" (D'Abate, Youndt & Wenzel, 2009). Furthermore, an evaluation of internship performance by employers showed both satisfactory results for student interns with a need for improvement in maturity and acceptance of critiquing (Fry & Irlbeck, 2012). A structured internship program can address both of these needs by ensuring engagement of interns and addressing skills needing improvement among interns.

Agricultural communications faculty members at [University] receive countless requests each year from area agri-businesses for students or entire classes to create simple marketing materials, such as brochures, videos, Web sites, or graphic designs. Therefore, [University's] Center of Agricultural Technology Transfer (CATT) incorporated an agricultural communications service center which is branded as Picador Creative. This branch of CATT consists of three undergraduate communications interns who are managed by a graduate student supervisor. This program provides more opportunities for agricultural communications students to obtain an internship and gain the valuable experiences found in an internship and ensure quality, hands-on experience, and Picador allows for agricultural businesses in the Lubbock community to receive affordable and professional communications materials that satisfy their business needs.

How it Works

Picador Creative began in 2013 after receiving a grant through USDA's Non-Land Grant Colleges of Agriculture (NLGCA). The [University's] Department of Agricultural Education and Communications was given the green light to create a communications service agency to help small, regional agricultural business with various communications needs, such as writing, graphic design, Web design, photography, and video production services at discounted rates when compared to other competitive services in the area.

The funding received allows a graduate student, skilled in the previous mentioned areas, to work on assistantship for the program to manage interns, secure client business, and liaison between the clients and the student interns/communications specialists. Interns are responsible for all communications products developed. Additionally, the interns manage promotional needs for the service center.

Picador Creative is fully staffed with three interns and one graduate assistant. Every week the interns and graduate assistant have a meeting to organize projects and set completion dates. Each intern is in charge of a client and project. The interns produce quality and innovative communications work for a nominal fee, and in turn, the client offers an invaluable educational experience to the student intern.

Results to Date

Picador Creative has been active for 18 months. Initial months were devoted to the start-up and development of promotional materials for the program. The promotional items allowed Picador Creative to obtain a steady customer base. As more clients hear about the services provided, the demand for services from Picador Creative continues to grow. Word-of-mouth and social media advertising through the website and Facebook page has spread the name across the region. Picador Creative has had more than 30 clients, some of which include the National Ranching Heritage Center, a local drink manufacturer, the university's natural resources department, a furniture store, a cattle breed organization, a veterinarian, and smaller up-and-coming businesses.

Future Plans/Advice

In future semesters, we hope to increase the number of interns who work for Picador Creative and expand the types of services offered. The first expansion would increase the number of interns to six and additional graduate assistant. With this expansion, Picador wants to increase the amount of available work within the departments of the College of Agricultural Sciences and Natural Resources. This expansion will allow each student to work directly with department chairs to create communication and promotional materials. Picador will still be obtaining outside clients. In addition, future plans include offering research services to clients. This type of service would allow Picador to create customized marketing plans for each client, meeting their needs on a deeper level. Additionally, social media strategies could also be offered. Through information collected through online customer evaluations, supervisors can identify areas of improvement for the interns. Because Picador Creative's rates are so low, the service will probably never be self-sustaining; therefore, faculty are continually seeking external to continue the project, hire more interns, and acquire more equipment, such as cameras and/or computers.

After seeing the program in action, [University] would advise anyone interested in a similar program to evaluate the demand for communication services in agricultural businesses around their region. This can easily be done by contacting industry leaders, extension services, and businesses in the surrounding area.

Cost/Resources Needed

There was substantial funding required to initiate this project and would not be possible without external funding through USDA's NLGCA. In order to implement a similar service center into any program, funds will be needed to pay interns and fund the graduate student coordinators. Salaries for these positions would vary by university. Scholarship funding could be acquired for the interns rather than hourly pay. Computers, printers, Adobe Creative Cloud, and camera equipment are also needed resources. Interns should be available to devote approximately 20 hours of work to the program each week. After facilities, administration, and equipment cost for one intern averaging $7,500, the project's budget is approximately $95,000.

References

Pennington, P. (2004). Professional Development in Agriculture: Opening Doors through Creative Leadership. *NACTA Journal, 48(4)*. 27-30. Retrieved from http://www.nactateachers.org/attachments/article/427/Pennington_NACTA_Dec_04_Journal-5.pdf

Fry, J., & Irlbeck, E. (2012). Evaluating Interns: An Analysis of Supervisors' Satisfaction with Agricultural Communications Interns. *Proceedings of the 2012 AAAE National Research Conference. Asheville, NC.*

Gault, J., Redington, J., & Schlager, T. (2000). Undergraduate business internships and career success: are they related?. *Journal of Marketing Education*, *22*(1), 45-53.

D'abate, C. P., Youndt, M. A., & Wenzel, K. E. (2009). Making the most of an internship: An empirical study of internship satisfaction. *Academy of Management Learning & Education*, *8*(4), 527-539.

Integrating Solar Photovoltaic Technology into Agricultural Education: Benefits and Challenges

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Integrating Solar Photovoltaic Technology into Agricultural Education: Benefits and Challenges

Introduction

Energy literacy (such as STEM education) and sector-based training must be integral parts of the state's educational system for Arizona to be competitive (Arizona, 2014). Energy continues to be in the news and is an important issue yet many undergraduate students know little about energy production or supply and use (George, Amel, & Mueller, 2005). According to the *National Solar Jobs Census,* employment in the solar industry has grown by 86% in the past five years (Le, 2015). The expanding solar industry provides opportunities for system marketing and sales, system design, research, and system installation, operation, and maintenance. Several challenges exist for integrating renewable energy into the agricultural education curriculum: technical training for the instructor, funding (for materials and technical training), student engagement, relevancy to existing curriculum, and sustainability to continue the effort.

How it Works

Funding sources for this project have included multiple institutional grants (University of Arizona Green Fund Committee, University of Arizona Water, Environmental, and Energy Solutions (WEES)), the Haury Grant, the O'Brien Diversity Grant, and federal grants (Department of Energy (DOE), USDA Outreach, and USDA Western SARE Grants). The primary source of training has been a renewable energy education and training non-profit organization, Solar Energy International (www.solarenergy.org). Training includes multiple online and face-to-face courses, and hands-on week-long workshops at their Paonia, Colorado training facility. Course topics include solar water pumping, grid-tied solar photovoltaic (PV) systems, battery-based systems, technical sales and marketing, and solar tools, inspection, and maintenance. The hands-on projects used to engage students, teachers, extension agents, and farmers & ranchers has been the solar fountain. A 12-volt DC pump wired to a 20-watt PV module (or multiple modules) is used to pump water through a PVC pipe fountain. The system is simple to assemble and offers the instructor the ability to teach Ohm's Law concepts (Watts = Voltage x Current), effect of PV module tilt & orientation on pump performance, effect of shading (level of irradiance) on current, series and parallel circuit wiring concepts and pump performance. Activities included a solar fountain design fair for AGTM students, a solar installation on a rainwater harvesting project, and a ground-mount solar project for hands-on training in module installation and connection. The project has many applications to STEM instruction. Including photovoltaic effect (electron-level), calculations, and system design.

Results to Date

Audiences have included high school agriculture students, high school students participating in a College of Engineering Summer Engineering Academy, middle school students in a summer-enrichment program, agricultural education instructors, and university engineering students, pre-service Ag Ed student teachers, Cooperative Extension agents, and members of a tribal cattle growers association. Students use hand tools to measure solar irradiance, module tilt, orientation, solar cell temperature, and voltage and current in a safe manner. Solar PV system differences are presented, as well as components of different systems. Solar PV energy combines DC wiring concepts and AC wiring concepts. Solar water pumping is an example of a PV-direct system (PV matches the load). Calculations to determine PV system sizes are relevant and appropriate for target audiences.

Future Plans

To expose a greater number of undergraduate students to solar energy concepts and renewable energy, the creation of a series of online courses (three) for the Department of Agricultural Education Agricultural Technology Management (AGTM) degree career pathway in renewable energies is underway. The three courses will include *Introduction to Renewable Energies*, *Solar Photovoltaic Energy Systems*, and *Solar Water Pumping System Applications for Agriculture.* Recently, a $5,000.00 grant was awarded by the University of Arizona Green Fund Committee (effective July 1, 2015) to fund the development and installation of two (2) model solar-powered water pumping demonstration systems to be installed at the university agriculture center, and [CITY] Village Farm, a hands-on education outreach project of Cooperative Extension. The systems are examples of re-circulating "mock wells" and include a pole-mounted PV panel, water trough, and DC-powered pump in a PVC pipe "well". Water is moved from the well to the water trough and drained back into the well. Additional funding is being sought from a USDA Western SARE Research/Education Grant (www.westernsare.org/Grants/Types-of-Grants) project to fund the development and demonstration of multiple solar-powered water pumping systems for livestock producers. Undergraduate students will be recruited to assist with water well modifications, and data collection. Adding a charge controller and a sealed-battery to an existing system expands student learning to include a stand-alone PV system where power is stored and a load can operate when the sun is not shining.

Costs/Resources Needed

The solar fountain demonstration kit can be assembled for less than $130.00. Clear PVC pipe and components (½ inch diameter pipe, slip caps and slip tee) allow students to view the movement of water as it is moved upward from the pump. An economical alternative is to use white PVC pipe and components. A guide with use and selection of materials is listed in the reference section. Below are basic system components and suggested sources:

- Rule 24 bilge pump, 12 volt DC (www.amazon.com)
- Solarland PV module, 20 watt (www.sunpumps.com)
- Bucket, five-gallon (www.Lowe's.com)
- PVC pipe (1/2"), fittings (www. Grainger.com)
- Vinyl tubing (5/8 ID), clear (www. Lowes.com)
- PV cables, MC-3 disconnects, female, and male (www.pv-cables.com)
- Wire nuts, 2 (www.Lowes.com)

Recommended hand tools include a digital clamp-on ammeter---with the ability to measure both AC voltage and current, and DC voltage and current--- (www.Sears.com), an inclinometer (to measure degree tilt angle of modules), and an irradiance meter (Daystar Pyranometer – www.altestore.com).

References

Arizona Governor's Office of Energy Policy (2014). *emPowerArizona: executive energy assessment and pathways, 2014*. Retrieved from http://www.[STATE]energy.gov/doclib/2014_EmPower_[STATE}.pdf:

Aronson, H., & Allen, T. (2005). Make a solar fountain. *Home Power Magazine, 106*, April/May. 60-64. Retrieved from: http://solarschoolhouse.org/wp-content/uploads/2015/02/HP106-Fountain-AronsonAllen-final-AA.pdf

George, C., Amel, E., & Mueller, K. (2006). A solar-powered decorative water fountain hands-on build to expose engineering concepts to non-majors. *American Society for Engineering Education*. Retrieved from: http://courseweb.stthomas.edu/powerup/publish/655_A_SOLAR_POWERED_DECORATIVE_WATER_FOUNTAI.pdf

Le, Minh (2015, January 15). 1 in 78 new jobs in America is a solar job. *Office of Energy Efficiency and Renewable Energy. Energy.gov* Retrieved from: http://energy.gov/eere/articles/1-78-new-jobs-america-solar-job

The Rahus Institute (2010). Solar fountain sculpture set user guide, Martinez, CA. Retrieved from: http://old.solarschoolhouse.net/resources/SSH_SolarFountainSet_Guidev20110929.pdf

Using a Private Facebook Page as Virtual Collaboration for a Cohort of Student Teachers

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Using a Private Facebook Page as Virtual Collaboration for a Cohort of Student Teachers

Introduction/Need for Innovation

Student teaching has more effectiveness when built on collaboration allowing novice teachers to share their ideas and strategies with each other while being supervised in their efforts by qualified faculty members. (Montgomery, 2000; Sudzina, Giebelhaus, & Coolican, 1997). Innovations which allow student teachers to interact more with these groups have the potential for increasing efficacy and collegiality among cohort groups (Darling-Hammond & Bransford, 2007).

Darling-Hammond and Bransford (2007) posit that while immersed in the student teaching experience, student teachers want to know what their fellow student teachers are doing so they can build upon established ideas. Success in the student teaching arena, and subsequent increases in efficacy can be attributed in part to support outside of the cooperating center (Aydin & Woolfolk-Hoy, 2005). Developing a platform for virtual collaboration during the student teaching experience can allow a constant contact with peers during a time when student teachers are geographically separated (Wankel, 2012).

Teacher educators on the university level play an integral role in the student teaching experience (Darling-Hammond & Bransford, 2007). They evaluate the student teachers' performance, but are constrained in their evaluation by not constantly being available at the student teaching sites. Allowing university supervisors to gain insight into activities of student teachers, even through a static media, can provide greater insight into the actions occurring daily at a student teaching center (Seabrooks, Kenney, & Lamontagne, 2000).

Requiring student teachers to post pictures weekly to catalog their experiences has three main goals. First, this idea was developed as a way to stimulate collaboration and idea-sharing between members of the student teaching cohort. Second, it allowed the university supervisors to witness what happened in the classroom without actually being present each week. Finally, there was a desire to use the photos gathered as a way to publically promote the agricultural education program and demonstrate how student teachers were experiencing the three-circle model of agricultural education.

How it Works

In the Spring 2015 student teaching semester, a group Facebook page was set up by university faculty, and each student teacher and university supervisor was invited to join. The group was closed, meaning privacy settings were established so only members who had been invited and approved could post or view the posts on the page. A faculty member remained the administrator on the group page and monitored the posts for content and number of submissions per student teacher.

As a preface to the assignment, student teachers were given instructions related to the methods for posting to the page and guidelines for taking non-identifying pictures of students. Students were each required to share a minimum of one photo taken during their student teaching experience each week and upload it to the group page, along with a brief description of the photo.

At the end of the semester, faculty members used the collected photos to highlight the successes of student teachers during the end of semester recognition dinner.

Results to Date/Implications

Student teachers posted 566 total photos of 350 unique events to the private group page over the course of the twelve week student teaching semester, far exceeding the requirement of one photo per student teacher per week. Photos ranged in nature from individual student projects to large-scale student teaching tasks. The implementation of this page allowed student teachers to collaborate, faculty members to gain greater insight into the daily tasks of each student teacher, and provided a wealth of images for future program publicity purposes.

Student teachers commented that having the pictures on the group Facebook page allowed them to see what was happening in their peers' experience, and almost all student teachers contacted at least one other member of their cohort to share ideas and materials for lesson plans, labs, and FFA activities. One student teacher said, "it felt like we were all still together, and able to rely on each other." Another student teacher commented, "it made me want to do better, because I felt like everyone else was doing such cool things." This comment highlighted an inadvertent result of the photo sharing assignment, student teachers were motivated by the quality activities shared by their peers to increase their level of performance.

University supervisors agreed that having the weekly posts allowed them to have a deeper insight into the activities of the student teachers they supervised, and gave them information which was used to tailor their mentoring of each student teacher. Faculty members were also able to gather more than 150 quality images which can be used for promoting the agricultural education program at Texas A&M University.

Future Plans/Advice to Others

We plan to continue using private Facebook groups for future student teachers to post their pictures, using the same assignment outline. We also plan to use these pictures in promotional materials for our department, and post them on a public Facebook site after they have been screened for FERPA violations. This will help showcase the outstanding work our student teachers are doing each semester.

Costs/Resources Needed

In order to complete the assignment, student teachers were required to have a Facebook page. To create the individual accounts and private Facebook group, no monetary resources were needed. One faculty member dedicated a small amount of time to monitoring the Facebook group and ensure student teachers were posting at least once per week.

References

Aydin, Y. C., & Woolfolk Hoy, A. (2005). What predicts student teacher self-efficacy?. *Academic Exchange Quarterly*, *9*(4), 123-127.

Darling-Hammond, L., & Bransford, J. (Eds.) (2007). *Preparing teachers for a changing world: What teachers should learn and be able to do.* San Francisco, CA: Jossey-Bass.

Montgomery, B. (2000). The student and cooperating teacher relationship. *Journal of Family and Consumer Sciences Education*, *18*(2), 7-15.

Seabrooks, J. J., Kenney, S., & Lamontagne, M. (2000). Collaboration and virtual mentoring: Building relationships between pre-service and in-service special education teachers. *Journal of Information Technology for Teacher Education*, *9*(2), 219-236.

Sudzina, M., Giebelhaus, C., & Coolican, M. (1997). Mentor or tormentor: The role of the cooperating teacher in student teacher success or failure. *Action in Teacher Education*, *18*(4), 23-35.

Wankel, C. (2009). Management education using social media. *Organization Management Journal*, *6*(4), 251-262.

Using Kolb's Learning Style Inventory as a Tool for Agricultural Education Student Teachers

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Using Kolb's Learning Style Inventory as a Tool for Agricultural Education Student Teachers

Introduction/Need for Innovation

Student teaching is an experience which culminates in the development of a preference for teaching style (Darling-Hammond & Bransford, 2007). Understanding learning style may be an important factor in making teaching-related decisions which eventually lead a student teacher to develop a specific style of teaching. Agricultural education has always been experiential learning (Roberts, 2006), and is deeply rooted in experiential learning theory (Kolb, 1984). Learning by doing is the emphasis of agricultural education considering the devotion to laboratory activities, field trips, and supervised agricultural experience programs (Phipps and Osborne, 1988).

While several different instruments exist to determine learning style (Liu & Reed, 1995), the instrument most closely related to experiential learning is Kolb's Learning Style Inventory (KLSI). The KLSI provides insight into the experiential learning modes set forth by Kolb of abstract conceptualization, active experimentation, concrete experience, and reflective observation (Kolb & Kolb, 2013). Researchers have concluded that using KLSI can indicate learning preferences for a group of educators, which could provide insight into how they prefer to teach (Kolb & Kolb 2005).

Teachers must grasp the context of their own learning style and apply that to their teaching methods (Marshall, 1991). Researchers have determined that matching learning styles to teaching style leads to a positive impact for both the teacher and their students (Smith & Renzulli, 1984). As novice teachers discover how they learn, they can apply that to environmental management and curriculum delivery (Marshall, 1991).

To help novice agricultural educators become aware of the role their learning style plays in their teaching begins with a coordinated effort to allow student teachers to assess their learning style and examine how that style can impact their role as an educator. The goal of this innovative idea was to allow student teachers a solid assessment of their learning style so they could examine the role it played in their student teaching experience.

How it Works

At the beginning of the student teaching semester, student teachers took the KLSI version 3.2 instrument, and interpreted their results. The instrument is comprised of 12 statements, each having 4 forced-ranking response options. Respondents rank the four corresponding statements from "most like me" to "least like me". Each response is directly related to one of Kolb's (1984) learning modes.

Instruction was given to student teachers related to how to interpret their scores and determine their learning style from the styles outlined in the KLSI version 3.2 workbook. Student teachers were given instruction related to understanding the strengths and weaknesses of their style and completed a reflection activity to relate learning style directly to their role as an agricultural educator. At the mid semester and end of semester conference, student teachers were asked to examine how their learning style played a role in their student teaching goals.

Results to Date/Implications

Student teachers from Fall 2014 and Spring 2015 (n = 34) completed the KLSI instrument at the beginning of their student teaching semester as a tool to supplement their development as novice educators. While this tool was initially designed to be a way to provide a personal connection to experiential learning theory, it has become a valuable standalone portion of the student teaching instruction. Student teachers have commented that understanding where they fit in regards to their preferences in the experiential learning cycle allowed them to develop a better understanding of how their students learned. On an evaluation of the student teaching semester, one student teacher wrote:

> Honestly, understanding that I was an initiator [specific KLSI learning style] let me know why some students didn’t like the same activities I did. Knowing my learning style let me be more aware of the kids [students] learning styles too. Knowing our learning style was one of the most helpful things we did.

In addition, student teachers commented that they were able to use their knowledge of their learning style as a platform for understanding their relationship with their cooperating teacher mentor. One student teacher commented that they had been able to prevent conflict with their cooperating teacher by understanding the differences which existed between their learning styles. Giving student teachers information on how they preferred to learn at the beginning of the semester was a valuable tool in promoting reflection on their experience. Increasing reflection is an important implication of using this tool prior to student teaching.

Future Plans/Advice to Others

The success of this innovation has led to the KLSI earning a permanent place in our pre-student teaching conference. We intend on expanding our instruction into the semester before student teaching to allow students more time to reflect on how their learning style plays a role in their overall development as an educator. One of the most important pieces of advice for successful completion of this innovation is knowledge of KLSI from a faculty standpoint so a resource exists onsite to help student teachers more completely understand how the KLSI score relates to teaching tasks and the broader experiential learning theory.

Costs/Resources Needed

KLSI version 3.2 is commercially available from HayGroup ®. A single copy of the instrument with a workbook containing information related to the detailed strengths and weaknesses of each of the nine learning styles is currently sold for $15.80. Minimal faculty time was required to administer the exam, although the ability to give instruction related to how the KLSI learning style relates to teaching related tasks allowed us to better incorporate this tool into our student teacher instruction.

References

Darling-Hammond, L., & Bransford, J. (Eds.) (2007). *Preparing teachers for a changing world: What teachers should learn and be able to do.* San Francisco, CA: Jossey-Bass.

Liu, M., & Reed, W. M. (1995). The relationship between the learning strategies and learning styles in a hypermedia environment. *Computers in human behavior, 10*(4), 419-434. doi: 10.1016/0747-5632(94)90038-8

Kolb, A. Y., & Kolb, D. A. (2005). *The Kolb Learning Style Inventory version 3.1 2005 technical specifications.* Philadelphia, PA: HayGroup. Retrieved from http://learningfromexperience.com/media/2010/08/tech_spec_lsi.pdf

Kolb, A. Y., & Kolb, D. A. (2013). *Kolb Learning Style Inventory workbook version 3.2.* Philadelphia, PA: HayGroup.

Kolb D. (1984). *Experiential learning as the science of learning and development*. Englewood Cliffs, NJ: Prentice Hall.

Marshall, C. (1991). Teachers' learning styles: How they affect student learning. *The Clearing House, 64*(4), 225-227.

Phipps, L. J., & Osborne, E. W. (1988). *Handbook on agricultural education in public schools*. Danville, IL: Interstate.

Roberts, T. G. (2006). A philosophical examination of experiential learning theory for agricultural educators. *Journal of Agricultural Education, 47*(1), 17-29. doi:10.5032/jae.2006.01017

Smith, L. H., & Renzulli, J. S. (1984). Learning style preferences: A practical approach for classroom teachers. *Theory into Practice, 23*(1), 44-50. doi: 10.1080/00405848409543088

#FarmBill: Using a Hashtag to Extend the Reach of a Student-Planned Forum

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#FarmBill: Using a Hashtag to Extend the Reach of a Student-Planned Forum

Introduction

The evolution of interactive, social, and self-publishing media on the Web has irrevocably changed the way we communicate (Allen, Abrams, Meyers & Shultz, 2010). Social media sites are impacting communication and the way that organizations and publics operate and connect with audiences. These platforms allow for a two-way conversation to be facilitated through direct channels of communication between businesses, organizations and their publics. Social media tools can be beneficial because "they provide a cost-free forum for the expression of ideas, information and opinion" (Wright & Hinson, 2009). Furthermore, "they [social media outlets] increase the immediacy of communication and offer platforms for public opinion on various issues" (Wright & Hinson, 2009).

Beyond the social media outlets, a component that is also beneficial is a "hashtag" (#). A hashtag is a keyword, and when people search for a keyword, all tweets or posts with the "#" ahead of it will pop up (Paulson, 2009). The use of hashtags on [social media] allows for information organization and makes topics more searchable (Cameron, 2009). Many event organizers are utilizing hashtags; without many attendees knowing each other at an event, it is simple to aggregate their tweets. In order to join a community's discussion about a topic or to participate within [an event] it is sufficient to tag one's messages with the official hashtag of an event. It becomes easier to share ideas, impressions, comments and additional materials (Ebner, Mühlburger, Schaffert, Schiefner, Reinhardt & Wheeler, 2010). Event attendees and participants can search for tweets within the event hashtag and are able to follow the ongoing microblogging stream from the event.

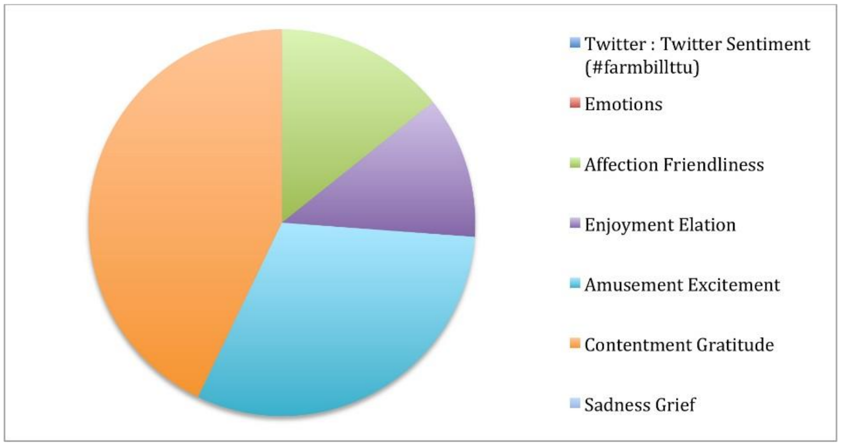
How It Works

Agricultural communications students at [University] are required to take Professional Development in Agricultural Communications. The course focuses on career and internship preparation as well as event planning and execution. In the event planning portion of the course, students plan and execute an event within one semester for an organization with a need for a professionally planned event. For one of the events, students planned a Farm Bill forum for local agriculture producers and businesses. The forum featured four experts guest speakers that had extensive knowledge about the farm bill, and was a way to bring multiple agricultural and business interest groups together to learn more about a complex issue. Local agricultural producers and businesses, students in the course, university employees, local media, and others with an interest in the farm bill attended. Attendees and participants were encouraged to interact during the forum by posting on Twitter, Facebook or Instagram with the forum-specific hashtag. The students and instructor in the course that organized the forum were sharing the information from the speakers to the event's Twitter and Facebook accounts. Audience members also participated.

One of the goals of the National Research Agenda (Priority Area 2) is to increase the use of new technologies and social networking for communication to target audiences (Doerfert, 2011, p.17). The event organizers' goal was to increase the visibility of the university, the outreach of the College of Agriculture and Natural Resources, and to increase audience reach by encouraging and reminding attendees to use the designated hashtag. [University] Department of Agricultural Communications partnered with the College of Media and Communications, which has a social media analysis lab to analyze the posts during the event. The social media monitoring system, Hoot Suite Enterprise, ran analytic reports one week after the event. The analytics provided Twitter retweets, mentions, sentiment, and keywords for the event hashtag, as well as the Facebook daily likes, page activity, post feedback and reach by region.

Results to Date

The hashtag was used 269 times, the organization's handle, or "@" followed by the organization's name, was mentioned 14 times, and the Facebook posts had a total of 11 shares throughout the day. The sentiment for the event was positive (see Figure 1).



Future Plans

Students enrolled in the class have planned one other issue forum, but it did not have the audience size nor the social media following as the farm bill forum. Plans for the Spring 2016 course include another forum for students to organize, and use of an event hashtag and an active social media presence from all students involved will be required. The event hashtag extended the reach of the forum to those who could not attend. Future event hashtags will be promoted well in advance, and students will be required submit a social media plan with posts beginning several weeks before the event to increase attendance and posts during the event to reach audiences not in attendance.

Costs/Resources

The costs incurred for this event were very minimal. Forum presenters, venue rental, and refreshments cost less than $500. This event was funded through a USDA Non Land Grant Colleges of Agriculture Capacity Building grant. Social media planning and posting did not cost money; however, time was invested by students and the instructor to ensure proper execution.

References

Allen, K., Abrams, K., Meyers, C., & Shultz, A. (2010). *A little birdie told me about agriculture: Best practices and future uses of Twitter in agricultural communications.* Journal of Applied Communications, *94*(2010), 3-4.

Cameron, C. (2009). *Is Twitter the start of web 3.0?* [Web log message]. Retrieved from http://www.workingthree.com/internet/twitter-is-the-start-of-web-30.

Doerfert, D. e. (2011). National Research Agenda: American Association for Agricultural Education's Research Priority Areas for 2011--2015. Lubbock, TX: Texas Tech University, Department of Agricultural Education and Communications.

Ebner, M., Mühlburger, H., Schaffert, S., Schiefner, M., Reinhardt, W., & Wheeler, S. (2010). Getting Granular on Twitter: Tweets from a Conference and Their Limited Usefulness for Non-participants. *Key Competencies in the Knowledge Society IFIP Advances in Information and Communication Technology*, 102-113. Retrieved June 12, 2015, from http://download.springer.com/static/pdf/861/chp%3A10.1007%2F978-3-642-15378-5_10.pdf?originUrl=http://link.springer.com/chapter/10.1007/978-3-642-15378-5_10&token2=exp=1440099112~acl=/static/pdf/861/chp%253A10.1007%252F978-3-64

Paulson, H. (2009, August 25). What the heck is Twitter, and what do I do with it? Daily Camera. Retrieved June 12, 2015. http://www.dailycamera.com/ci_13169356?source=most_emailed

Wright, D. K., & Hinson, M. D. (2009). *An analysis of the increasing impact of social and other new media on public relations.* 12th Annual International Public Relations Research Conference, Miami, FL.