Journal of Agricultural Education
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Volume 57, Issue 4, 2016

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(Terms end on December 31)

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4417 Agricultural Sciences Building, P.O. Box 6108
Morgantown, WV 26506
Phone: (304) 293-5451 Email: harry.boone@mail.wvu.edu

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Exploring the Role of Agriculture Teachers in Core Academic Integration

Aaron J. McKim¹, Tyson J. Sorensen², and Jonathan J. Velez³

Abstract

Core academic skills are essential for success in our society. However, an abundance of research has identified a large proportion of secondary school students are underperforming in core academic areas such as literacy and math. Researchers have suggested integrating core academic content throughout all secondary coursework as a potential solution to students’ underperformance in core academics. This study focused on core academic integration in secondary agricultural education classrooms and explored a conceptual model for teachers’ core academic integration competence in the areas of math and literacy. Results indicated pedagogical competence and technical knowledge were significant predictors of teachers’ reading integration competence. Pedagogical competence was also a significant predictor of respondents’ writing and math integration competences. These findings highlight the importance of agriculture teachers’ ability to engage students through effective pedagogical strategies as a potential precursor to competence integrating reading, writing, and math. Implications and strategies for utilizing the proposed model and the findings from this research are discussed.

Keywords: Academic integration; math integration; literacy integration; competence

Introduction

In order to meet the demands of an ever-changing society, students must be empowered with knowledge in a broad range of disciplines including science, engineering, mathematics, and literacy. With numerous studies reporting American students underperforming in these critical disciplines (ACT 2005; OECD, 2012), the search is on for solutions. The contextualized learning potential within agricultural education, in which core academic “principles become more real and understandable for students” (Phipps, Osborne, Dyer, & Ball, 2008, p. 4), provides a possible springboard for student understanding of core academics. This solution requires agriculture teachers competent in the integration of core academics. This study sought to test a model of teachers’ perceived competence integrating two core academic subjects, literacy and math. In the following sections, we explore the integration of these core academic topics and their relevance in agricultural education.

Content Area Literacy

An individual’s ability to read and write is an essential component to their potential for success in academics and life (Biancarosa & Snow, 2006; Graham & Perin, 2007). One of the roles of education is to develop skills necessary for students to be competitive in a global marketplace;

¹ Aaron J. McKim is an Assistant Professor of Agriculture, Food, and Natural Resources Education in the Department of Community Sustainability at Michigan State University, 480 Wilson Road Room 131, East Lansing, MI 48824, ajmckim@gmail.com.
² Tyson J. Sorensen is an Assistant Professor of Agricultural Education in the School of Applied Sciences, Technology and Education at Utah State University, 2300 Old Main Hill, Logan, UT 84322, tyson.sorensen@usu.edu
³ Jonathan J. Velez is an Associate Professor in the Department of Agricultural Education and Agricultural Sciences Department at Oregon State University, 112 Strand Agriculture Hall, Corvallis, OR 97331, Jonathan.Velez@oregonstate.edu
an important feature of this skillset is literacy (Biancarosa & Snow, 2006). In fact, research conducted by the National Association of Colleges and Employers indicates literacy skills are one of the most sought after attributes among potential employees (NACE, 2014). Speaking specifically about the literacy skill of writing, Graham and Perin (2007) stated it “is not just an option for young people – it is a necessity” (p. 3).

Research into the development of literacy skills among high school students has been spurred by the overwhelming evidence indicating secondary students are underperforming in literacy. Specifically, studies report 32% of high school graduates are unprepared for college level literacy coursework (ACT, 2005), 40% of high school graduates do not have the literacy skills employers are looking for (Achieve, 2005), and a total of eight million students in grades eight through 12 struggle in reading (Biancarosa & Snow, 2006; Graham & Perin, 2007). The outcomes of this underperformance are numerous, including a higher susceptibility for dropout (Graham & Perin, 2007; Snow & Biancarosa, 2003). In a search for potential solutions to this literacy epidemic, researchers have proposed content area literacy as a method for increasing secondary students’ literacy (Biancarosa & Snow, 2006; Graham & Perin, 2007).

Content area literacy refers to “the ability to use reading and writing to learn subject matter in a given discipline” (Vacca & Vacca, 2002, p. 5). The concept of infusing literacy into courses offered outside the English department is widely supported throughout education (Hall, 2005; Shanahan & Shanahan, 2012). Research supports the notion that content area literacy improves students’ academic achievements both in literacy and in the subject area in which literacy is being integrated (Bangert-Drowns, Hurley, & Wilkinson, 2004; McConachie & Petrosky, 2010). Specific areas of improvement among students include increased student engagement, increased persistence, and increased achievement on standardized testing (McConachie & Petrosky, 2010). At the crux of content area literacy is a teacher’s decision to incorporate reading and writing into their practice (Biancarosa & Snow, 2006). Therefore, it is important to explore the teacher’s role as a potential gatekeeper to content area literacy.

Previous research suggests teachers generally have a positive perception toward teaching literacy; however, this positive perception often fails to translate into changes in classroom instruction (Hall, 2005). Research has identified a number of potential reasons behind this disconnect. McConachie and Petrosky (2010) cite content area teachers’ obligation to teach their own curricula as a potential barrier between perception and action. Park and Osborne (2005) identified perceived inadequacy to teach literacy, infringement on time spent teaching their content, and a lack of identified importance regarding teaching literacy as potential barriers to literacy integration. Furthermore, content area teachers may have never been trained in the specifics of integrating literacy in their discipline (Hall, 2005). For both preservice and inservice teachers, professional development regarding literacy integration is traditionally presented “as a decontextualized process that contains a set of skills/strategies that can be generically applied across the content areas” (Hall, 2005, p. 404). However, research suggests effective professional development entails empowering content area teachers to integrate literacy strategies tailored to their unique content area (Moje, 2007).

Content area literacy exemplifies the notion that literacy is truly an interdisciplinary subject that should be included in all secondary classrooms (D’Arcangelo, 2002). However, the majority of research in content area literacy has focused on literacy integration within math, history, science, and English language arts classrooms (Moje 2007; Shanahan & Shanahan, 2012). With the onus of literacy development being on all teachers, the breadth of research on literacy integration must grow (Park & Osborne, 2005, 2006a). Agricultural education is one content area with very little research exploring literacy integration.
Within agricultural education, research has identified agriculture teachers often neglect literacy integration in favor of the hands-on learning opportunities prevalent in agricultural education (Park & Osborne, 2006b). However, agriculture teachers still perceive teaching literacy concepts as a positive endeavor with the potential to benefit their students (Park & Osborne, 2006b). The research in agricultural education exemplifies the disconnect identified previously; teachers perceive literacy integration as positive yet fail to continually reinforce literacy skills and concepts within their classrooms. A potential factor between perceived importance and literacy implementation is teachers’ competence regarding literacy integration. This exploratory study sought to analyze Oregon agriculture teachers’ perceived competence regarding content area literacy integration.

Math Integration

Like literacy, individuals’ competence in mathematics is directly related to their potential for academic and professional success (Mullis, Martin, Foy, & Arora, 2012). Unfortunately, as was the case with literacy, secondary students in the United States are underperforming in mathematics (OECD, 2012; Stone, 2011). The level of underperformance is alarming, as Schmidt stated, “roughly three quarters of American high school students graduate with a relatively poor grasp of mathematics” (2011, p. 2). Again, content area integration of core academics has been lauded as a method for improving student performance in mathematics (NRC, 2011; Stone 2011).

Career and technical education (CTE) has been distinguished as an applicable context for integrating mathematics (Pearson et al., 2010). The nature of CTE provides a valuable model for math development; as Stone stated, “rigor resides in combining CTE and academic skills as applied to real-world problems” (2011, p. 10). The applied nature of CTE differs from the isolated nature of math education traditionally found in math classrooms. An integrated approach provides students with a relevant context, making math concepts less abstract and more tangible. In 2008, a research team tested the efficacy of math integration through a project called Math-in-CTE (Stone, Alfeld, & Pearson, 2008). Using experimental research methods, researchers tested math-enhanced CTE courses. The results showed students taught in the math integrated courses scored better on two standardized math assessments without any detrimental effect to their knowledge gain of CTE content (Stone et al., 2008).

Unlike content area literacy, a number of research studies in agricultural education have addressed math integration. Some of the earliest work (Loadman, 1986) established the foundational premise of agricultural education as an applicable context for integrating math. More recent research (Parr, Edwards, & Leising, 2006; Young, Edwards, & Leising, 2009) has explored the relationship between math integrated agricultural education classes and student performance in mathematics. These studies found students taught in math integrated agricultural education classrooms performed better in mathematics. Research in agricultural education, in combination with the Math-in-CTE study, illustrates the potential positive effects of a math integrated classroom.

While some research in agricultural education has highlighted the potential benefits of math integration, other studies have called into question agriculture teachers’ capacity for such integration. Miller and Gliem (1994, 1996) identified agriculture teachers’ knowledge of mathematics, or lack thereof, as a potential limiting factor to math integration in agricultural education. Jansen and Thompson (2008) supported this finding, as they suggested a teacher’s content knowledge strongly influenced their self-efficacy toward mathematics integration. More recent research suggests preservice agriculture education teachers lack the level of mathematics ability necessary for integrating mathematics (Stripling & Roberts, 2012a, 2012b; Stripling, Roberts, & Stephens, 2014). In an attempt to improve preservice teachers’ capacity for math integration, Stripling and Roberts (2013a, 2013b) tested a math integrated agricultural education...
teaching methods course and found a significant increase in preservice teachers’ personal mathematics ability. However, this research also identified insignificant increases in math teaching self-efficacy (Stripling & Roberts, 2013a) and insignificant decreases in math teaching self-efficacy (Stripling & Roberts, 2013b) after the math integrated preservice experience.

Research in agricultural education has established secondary agriculture classrooms as an applicable context for the integration of math content as well as the positive benefits of integrating math. However, research has also established the teacher as a critical factor in math integration. Based on the imperative role of the teacher in math integration, this study explored practicing agriculture teachers’ perceived competence toward math integration. Additionally, we developed and tested a model of unexplored predictive variables for math integration competence. By analyzing this model, our study provides valuable insight into factors potentially influencing agriculture teachers’ ability to integrate math.

**Theoretical Foundation and Conceptual Framework**

It is critical to consider both perceived competence and task value when examining the motivational components of core academic integration. In other words, teachers need to feel competent integrating core academics and also value integrating core academics in their curricula. Our theoretical foundation, based on the expectancy-value motivational theory (EVT) espoused by Wigfield and Eccles (2002), is grounded in the integral importance of both expectancies for success (i.e. competence) and value. As we consider integration, the EVT is foundational as it, “…suggests that teachers’ willingness to change their teaching practices is related to teachers’ expectations that they will be able to implement new practices effectively [competence], and that they will be rewarded for making the changes in their classroom practices, and that they will value the rewards they receive” (Tollefson, 2000, p. 74).

The EVT is based on two components, expectancies for success—an individual’s beliefs about how well they will do on upcoming tasks, and task value—the value placed in a given task (Wigfield & Eccles, 2000, 2002). Wigfield and Eccles (2002) postulate the presence of both is necessary for an individual to undertake a task and they are key determinants of choice. Wigfield and Eccles (2002) stated, “Expectancies and values are assumed to directly influence performance, persistence, and task choice.” (p. 118). As we consider the topic of academic integration, it is vital to consider both expectancies for success and the value teachers place on integration.

The concept of expectancy for success has been operationally defined as both competence and self-efficacy (Pajares, 1996; Wigfield & Eccles, 2000). In highlighting the similarities, Pajares (1997) stated, “Self-efficacy and other expectancy beliefs are similar in that they are each beliefs about one’s perceived capability…” (p. 19). While theoretical purists might argue the unique and subtle differences between expectancy for success, competence, and self-efficacy, we have chosen to focus on the overwhelming similarities as we situate our research. Prior research highlights the importance of competence and self-efficacy as they have been linked with teacher persistence, motivation, and resilience (Labone, 2004; Wheatley, 2005).

Merely feeling competent or efficacious is not enough to spur a teacher to action; rather, they must have a reason or incentive to act, defined as their task value (Wentzel & Wigfield, 1998). From a theory standpoint, task value can be further divided into attainment value—the importance of doing well, intrinsic value—personal enjoyment from doing a task, utility value—how it fits into future plans, and cost value—what one may need to give up to complete the task (Eccles, 2005; Wigfield & Eccles, 2002). For the purpose of this study, we assessed value but did not distinguish the four sub-components. However, it is important to recognize the existence of these components as they may play a role in the value judgments of teachers. For instance, cost value directly relates to academic integration in that teachers may weigh and assess the value of core academic
integration in light of the potential loss of instructional time specific to agriculture. Task value has been linked to increased persistence, greater student outcomes, and higher overall satisfaction with teaching (Ashton & Webb, 1986; Wigfield & Eccles, 2002).

Our intent was to extend the expectancy value motivational theory to a conceptual model for core academic integration in agricultural education (see Figure 1). In addition to task value, research highlights a number of potential factors influencing academic integration; in this study we will focus on two of these factors, pedagogical competence and technical knowledge. We operationalized technical knowledge as a teacher’s understanding of the content in which core academics will be integrated. Research supports the notion that teachers must first be knowledgeable in their content before being able to integrate core academics (NRC, 2011). In agricultural education, this requires teachers knowledgeable in the variety of course offerings they teach. In addition to technical knowledge, research highlights pedagogical competence as a requirement for core academic integration. Teachers use their “pedagogical knowledge to convey that content to the students in an intelligible fashion and in such a way that it creates meaningful learning experiences for students” (Schmidt, 2011, p. 15). Teachers lacking competence in pedagogy will struggle to integrate core academics due to their inability to engage students.

![Conceptual model of core academic integration competence.](image_url)

**Figure 1.** Conceptual model of core academic integration competence.

**Purpose and Objectives**

The purpose of this research was to gain a deeper understanding of the teacher’s role in core academic integration by testing a conceptual model for reading, writing, and math integration in agricultural education. In accomplishing this purpose, our research addressed National Research Agenda priority number five, efficient and effective agricultural education programs (Roberts, Harder, & Brashears, 2016). This priority area identifies effective programs as those meeting the academic needs of learners. Given the overwhelming need for literacy and math skills for success in academics and life, research addressing agriculture teachers’ competence in integrating core academic concepts is relevant. The following research objectives were established to guide the development and execution of this study:

1) Describe the sample of agriculture teachers.
2) Describe agriculture teachers’ task value and perceived competence in reading, writing, and math integration.
3) Determine the relationship between agriculture teachers’ reading integration competence and their task value toward reading integration, pedagogical competence, and technical knowledge.
4) Determine the relationship between agriculture teachers’ writing integration competence and their task value toward writing integration, pedagogical competence, and technical knowledge.

5) Determine the relationship between agriculture teachers’ math integration competence and their task value toward math integration, pedagogical competence, and technical knowledge.

**Methods**

The population for this study included all school-based agriculture teachers in Oregon ($N = 111$) during the 2013-2014 school year. Contact information was obtained from the Oregon Agriculture Teacher Directory and was vetted for accuracy by experts in the field of agricultural education in Oregon. The data collected through this study were part of a larger research project.

We attempted a census of all secondary school agriculture teachers in the state. Data were collected in December of 2013 using the online survey 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. The final point of contact was a phone-call to individuals who had not yet responded. A total of 80 useable responses were completed, yielding a 72% response rate. We checked for non-response error by comparing participants who responded after the final two points of contact (late respondents; $n = 31$) to those who responded prior to the final two points of contact (on-time respondents; $n = 49$) (Lindner, Murphy, & Briers, 2001; Miller & Smith, 1983). We found late respondents to be statistically similar to on-time respondents for the eight variables of interest: agriculture teachers’ task value and perceived competence toward reading integration, writing integration, and math integration as well as pedagogical and technical competence. Therefore, we did not consider non-response error to be significant (Lindner et al., 2001; Miller & Smith, 1983). In this study, we treated non-responders as a sample of the total population of agriculture teachers in Oregon and we generalized our findings to this population.

The survey instrument contained demographic information and eight different constructs measuring agriculture teachers’ task value and perceived competence toward the integration of reading, writing, and math as well as pedagogical competence and technical knowledge. The task value and competence constructs of reading, writing, and math integration were developed as part of a larger study. Individual items were developed using the Common Core standards in reading and writing for science and technical subjects (CCSS Initiative, 2010a) as well as the eight Common Core standards for mathematical practice (CCSS Initiative, 2010b). Both the reading and writing components of the Common Core included ten standards grouped into four larger themes. We analyzed these larger themes, and one item was developed based on the combination of standards within the different theme. For example, one theme within the writing Common Core is Research to Build and Present Knowledge, and the item we created from this theme stated: “Develop students’ ability to present knowledge through research projects in agricultural science and technology (AST).” Similarly, the eight standards for mathematical practice were combined into three themes by the researchers. From these three themes, individual instrument items were developed to measure task value and competence for math integration. We then developed an individual item that reflected the purpose of the standards in each of the three themes. For example, the following item was developed from the problem solving theme: “Develop students’ ability to correctly solve AST related math problems.” A total of 11 individual items were utilized to measure reading (four items), writing (four items), and math (three items) integration for both task value and competence. Teachers’ task value and perceived competence for each of the 11 items were measured using a five-point Likert-type scale ranging from 1 “Very Low” to 5 “Very High,” with higher scores indicating higher task value or perceived competence.
Items used to measure agriculture teachers’ pedagogical competence and technical knowledge were derived from previous literature (Boone & Boone, 2007; Duncan, Ricketts, Peake, & Uesseler, 2006; Garton & Chung, 1996; Layfield & Dobbins, 2002; Mundt & Connors, 1999; Myers, Dyer, & Washburn, 2005; Sorensen, Tarpley, & Warnick, 2010). Pedagogical competence and technical knowledge were measured on a five-point scale, ranging from 1 “Very Low” to 5 “Very High,” with higher scores indicating higher perceived pedagogical competence or technical knowledge. The pedagogical competence construct consisted of eleven items pertaining to classroom teaching methods and pedagogy. Sample items included teachers’ ability “teaching with experiments,” “evaluating student performance,” and “managing student behavior.” The technical knowledge construct consisted of twelve items relating to agriculture teachers’ ability to teach different technical areas of agriculture. Sample items included agriculture teachers’ perceived ability “teaching food science” and “teaching about public issues regarding agriculture.”

A panel of experts in the field of agricultural education examined the instrument and established content and face validity for the eight different constructs used in this study. The reliabilities for each construct were analyzed using Cronbach’s alpha and are reported in Table 1.

Table 1
Reliability Coefficients of Constructs for the Current Study

<table>
<thead>
<tr>
<th>Construct</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task Value</td>
<td></td>
</tr>
<tr>
<td>Reading Integration</td>
<td>.91</td>
</tr>
<tr>
<td>Writing Integration</td>
<td>.95</td>
</tr>
<tr>
<td>Math Integration</td>
<td>.94</td>
</tr>
<tr>
<td>Competence</td>
<td></td>
</tr>
<tr>
<td>Reading Integration</td>
<td>.85</td>
</tr>
<tr>
<td>Writing Integration</td>
<td>.85</td>
</tr>
<tr>
<td>Math Integration</td>
<td>.94</td>
</tr>
<tr>
<td>Pedagogy</td>
<td>.82</td>
</tr>
<tr>
<td>Technical Knowledge</td>
<td>.77</td>
</tr>
</tbody>
</table>

We analyzed the data using the Statistical Package for the Social Sciences (SPSS) version 20. The first objective was demographic in nature; therefore, we reported the results as frequencies and percentages. Research objective two was descriptive in nature; consequently, we reported the results using means and standard deviations. To accomplish the final three research objectives, three different multiple linear regressions were performed in order to determine predictors of reading, writing, and math integration competence, respectively. Reading, writing, and math integration task value, pedagogical competence, and technical knowledge were simultaneously entered into the regression models as independent variables. Standardized betas for each entered variable and an overall $R^2$ for the model were calculated and reported.

Findings

Demographic information was collected from respondents ($n = 80$) to accomplish research objective one. The average age of responding teachers was 38 ($SD = 11.22$) years old, with a range of ages from 23 to 65. Respondents ranged from first year teachers to teachers with 33 years of
experience, with an average of 11 years of teaching experience \((SD = 9.07)\). The majority of respondents were male \((f = 44; 55.70\%)\). The most common courses respondents indicated teaching were Introduction to Agriculture, Plant Science, Animal Science, and Agricultural Mechanics.

The second objective of this study was to describe agriculture teachers’ task value and perceived competence in reading, writing, and math integration (see Table 2). Overall, respondents’ task value toward reading, writing, and math integration exceeded their perceived competence. In comparing the task value ascribed to the three core integration constructs, math integration was valued highest \((M = 3.87; SD = 0.75)\). In analyzing perceived competence, responding teachers perceived the highest level of competence in their reading integration \((M = 3.34; SD = 0.55)\). The differences between task value and perceived competence were equal for writing and math integration \((\Delta = 0.62)\), and exceeded what was observed within reading integration \((\Delta = 0.40)\).

Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Task Value</th>
<th>Perceived Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Reading Integration</td>
<td>3.74</td>
<td>0.66</td>
</tr>
<tr>
<td>Writing Integration</td>
<td>3.78</td>
<td>0.55</td>
</tr>
<tr>
<td>Math Integration</td>
<td>3.87</td>
<td>0.75</td>
</tr>
</tbody>
</table>

*Note. Task value and perceived competence items scaled from 1 “Very Low” to 5 “Very High.”*

The third research objective was to determine the relationship between agriculture teachers’ reading integration competence and their task value toward reading integration, pedagogical competence, and technical knowledge (see Table 3). Using our conceptual model for core academic integration, we ran a multiple linear regression with reading integration competence as the dependent variable and reading integration value, pedagogical competence, and technical knowledge as independent variables. The three independent variables, in combination, comprised a significant model \((F = 15.83; p-value < .001)\) and predicted 39\% \((R^2 = .39)\) of the variance in reading integration competence.

Two of the independent variables were significant in their prediction of reading integration competence; pedagogical competence and technical knowledge. Using the standardized coefficients \((\beta)\) to determine the strength of the relationship between independent and dependent variables, we found pedagogical competence to be the strongest predictor of reading integration competence \((\beta = .37; p-value = .004)\). Additionally, technical knowledge was identified as a significant predictor of reading integration competence \((\beta = .28; p-value = .030)\). The task value teachers attributed to reading integration was the only insignificant predictor in the model \((\beta = .08; p-value = .377)\).
Table 3  
*Predictive Model of Reading Integration Competence*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Dependent Variable: Reading Integration Competence</th>
<th>Zero-order correlation (r)</th>
<th>p-value</th>
<th>B</th>
<th>SEB</th>
<th>β</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Integration Value</td>
<td>.23</td>
<td>.039</td>
<td>.07</td>
<td>.08</td>
<td>.08</td>
<td>.377</td>
<td></td>
</tr>
<tr>
<td>Pedagogical Competence</td>
<td>.58</td>
<td>&lt;.001</td>
<td>.46</td>
<td>.15</td>
<td>.37</td>
<td>.004</td>
<td></td>
</tr>
<tr>
<td>Technical Knowledge</td>
<td>.56</td>
<td>&lt;.001</td>
<td>.32</td>
<td>.14</td>
<td>.28</td>
<td>.030</td>
<td></td>
</tr>
</tbody>
</table>

*Note. R = .63, R² = .39, F = 15.83, p-value < .001. Task value and perceived competence items scaled from 1 “Very Low” to 5 “Very High.”*

The fourth research objective was to determine the relationship between agriculture teachers’ writing integration competence and their task value toward writing integration, pedagogical competence, and technical knowledge (see Table 4). Our conceptual model for core academic integration was used to design a multiple linear regression model predicting writing integration competence using writing integration value, pedagogical competence, and technical knowledge as predictor variables. The model was significant in predicting writing integration competence ($F = 12.79; p$-value < .001) and predicted 34% ($R^2 = .34$) of the variance in teachers’ perceived competence toward writing. One of the independent variables, pedagogical competence, was significant in predicting writing integration competence ($β = .47; p$-value = .001). The two remaining independent variables, writing integration value ($β = .07; p$-value = .488) and technical knowledge ($β = .12; p$-value = .356), were not statistically significant in the prediction of writing integration competence.

Table 4  
*Predictive Model of Writing Integration Competence*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Dependent Variable: Writing Integration Competence</th>
<th>Zero-order correlation (r)</th>
<th>p-value</th>
<th>B</th>
<th>SEB</th>
<th>β</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing Integration Value</td>
<td>.26</td>
<td>.023</td>
<td>.05</td>
<td>.08</td>
<td>.07</td>
<td>.488</td>
<td></td>
</tr>
<tr>
<td>Pedagogical Competence</td>
<td>.57</td>
<td>&lt;.001</td>
<td>.57</td>
<td>.16</td>
<td>.47</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>Technical Knowledge</td>
<td>.46</td>
<td>&lt;.001</td>
<td>.14</td>
<td>.15</td>
<td>.12</td>
<td>.356</td>
<td></td>
</tr>
</tbody>
</table>

*Note. R = .58, R² = .34, F = 12.79, p-value < .001. Task value and perceived competence items scaled from 1 “Very Low” to 5 “Very High.”*

The fifth and final research objective was to determine the relationship between agriculture teachers’ math integration competence and their task value toward math integration, pedagogical competence, and technical knowledge (see Table 5). The conceptual model for core academic integration was used to design a multiple linear regression model of agriculture teachers’ perceived math integration competence. The model was significant ($F = 7.22; p$-value < .001) and the three independent variables, in combination, explained 22% ($R^2 = .22$) of the variance in teachers’ perceived math integration competence. One of the independent variables, pedagogical competence...
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(β = .30; p-value = .037), was a significant predictor of math integration competence. The remaining independent variables, math integration value (β = .04; p-value = .685) and technical knowledge (β = .20; p-value = .170), were not statistically significant in the prediction of math integration competence.

Table 5

Predictive Model of Math Integration Competence

<table>
<thead>
<tr>
<th>Variable</th>
<th>Dependent Variable: Math Integration Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zero-order correlation (r)  p-value  B  SEB  β  p-value</td>
</tr>
<tr>
<td>Math Integration Value</td>
<td>.20  .080  .05  .11  .04  .685</td>
</tr>
<tr>
<td>Pedagogical Competence</td>
<td>.48  &lt;.001  .53  .25  .30  .037</td>
</tr>
<tr>
<td>Technical Knowledge</td>
<td>.42  &lt;.001  .32  .30  .20  .170</td>
</tr>
</tbody>
</table>

Note. R = .47, R² = .22, F = 7.22, p-value < .001. Task value and perceived competence items scaled from 1 “Very Low” to 5 “Very High.”

Conclusions, Recommendations, and Implications

Integrating reading, writing, and math within all secondary classrooms has been proposed as a solution for student underperformance in these core subject areas. Research suggests career and technical education, including agricultural education, is an applicable context for integrating these core subjects (Park & Osborne, 2005; Parr et al., 2006; Young et al., 2009). However, integrating core academics requires teachers competent in this endeavor. The purpose of our research was to explore a conceptual model for agriculture teachers’ competence toward integrating reading, writing, and math. Using expectancy-value motivational theory (Wigfield & Eccles, 2002), our proposed model included three variables influencing agriculture teachers’ competence: (a) technical knowledge, (b) pedagogical competence, and (c) task value.

The first objective of this study was to describe the respondents. The population for this analysis was limited to teachers in one state due to the exploratory nature of our research. We encourage readers to use the information reported for the first objective when considering the transferability of our findings to the population(s) of their interest. Additionally, we recommend future research using the proposed model for core academic integration with larger populations.

The second objective of our study was to describe agriculture teachers’ task value and perceived competence in reading, writing, and math integration. Across the three academic areas, agriculture teachers’ task value exceeded their perceived competence. Expectancy-value motivational theory suggests an individual must have high expectancy for success (competence) as well as high perceived value in order for them to accomplish a given task (Wigfield & Eccles, 2002). While our research did not measure the amount of competence required to successfully integrate core academics, our comparison of competence and task value suggests resources allocated to increasing core academic integration should focus on teachers’ academic integration competence rather than their task value.

The third objective of this study was to operationalize the conceptual model for core academic integration into an analysis of teachers’ reading integration competence. Using multiple linear regression, we found our conceptual model to be a significant predictor of reading integration competence. Two of the independent variables, pedagogical competence and technical knowledge,
were statistically significant in their prediction of reading integration competence. This indicates teachers with higher competence in their pedagogy and increased technical knowledge in agriculture subjects have a higher competence toward reading integration. We suggest these findings imply reading integration is a higher level teaching skill, requiring teachers competent in their ability to engage students (pedagogical competence) and knowledgeable about the subject(s) they are teaching (technical knowledge). It is unreasonable to suggest an agriculture teacher should be integrating reading in their classroom if they do not fully understand agriculture content and are unable to engage their students. In practice, this suggests teacher educators ensure teachers are competent in the areas of pedagogy and technical knowledge before attending to core academic integration. Failure to do so may overload a struggling preservice or practicing teacher and reduce their confidence as an educator.

The fourth objective was to operationalize our conceptual model in an analysis of teachers’ writing integration competence. The conceptual model was found to be a significant predictor of writing integration competence. Only one independent variable, pedagogical competence, was found to be a significant predictor of writing integration competence. We suggest these findings indicate pedagogical competence as a foundational skill and writing integration as a higher order skill in agricultural education. In comparing the findings from objective four to the findings from objective three, we note technical knowledge as being an insignificant predictor of writing integration competence yet a significant predictor of reading integration competence. Potentially, this implies a looser connection between writing and technical knowledge than was observed between reading and technical knowledge. We recommend future research exploring the relationship comparing reading and writing integration and their connection to agriculture teachers’ technical knowledge.

The final objective of this study was to apply our conceptual model to an analysis of teachers’ math integration competence. Our model again proved to be significant, this time for teachers’ math integration. Furthermore, pedagogical competence was again identified as the only significant predictor, this time for math integration competence. These findings support the extension of our position that sound pedagogy is a prerequisite to math integration in agricultural education. Furthermore, these findings may explain why interventions during preservice teaching have been inconsistent in increasing math integration self-efficacy (Stripling & Roberts, 2013a, 2013b); preservice teachers are still developing their pedagogical competence and asking them to integrate mathematics may overload their developmental process as a teacher.

While the conceptual model was found to be significant in the prediction of teachers’ reading, writing, and math integration competence, we noted task value was an insignificant predictor throughout our findings. This supports previous research in core academic integration which has found a disconnect between the value teachers ascribe to core academic integration and their integration of core academics (Hall, 2005; McConachie & Petrosky, 2010; Park & Osborne, 2005). Our research indicates a necessary change in our initial conceptual model; specifically, pedagogical competence and technical knowledge as mediating variables between perceived value and competence in reading integration and pedagogical competence as a mediating variable between value and competence for writing and math integration. However, we also acknowledge the potential for additional variables influencing the relationship between value and competence. One variable not included in our analysis but recommended for continuing research exploring teachers’ competence in core academic integration is teachers’ knowledge of the core academics they are integrating.

Agricultural education holds the potential to positively influence students’ understanding of reading, writing, and math (Park & Osborne, 2005; Parr et al., 2006; Young et al., 2009). However, this positive influence can only be realized through agriculture teachers competent in core academic integration. A greater understanding of agriculture teachers’ competence in core
academic integration will empower teacher educators to increase teachers’ ability to integrate these core subjects. We believe our study provides a new conceptual model as well as empirical data useful toward understanding core academic integration. However, we also acknowledge the need for continued research exploring influential factors to teachers’ core academic integration competence in order to fully understand this phenomenon. Continuing in this effort will enhance teacher development in core academic integration and better position agricultural education as a powerful tool for student learning across academic boundaries.

References


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Development and Validation of an Instrument to Assess Youth Motivation to Participate in Career Development Events

Neil A. Knobloch, Colleen M. Brady, Kathryn S. Orvis, and Natalie J. Carroll

Abstract

Career development events develop career and life skills in youth, but limited work has been done to assess the motivation of students who participate in these events. The purpose of this study was to validate an instrument developed to measure youth motivation to participate in career development events. An instrument grounded in expectancy-value motivation was developed to assess student motivation of youth participants (N = 2,153) at 12 career development events in various domains at the state level. Four factors—self-efficacy, cost & utility value, intrinsic value, and attainment—explained 60% of the variance in youth motivation to participate in state career development events. Youth were most motivated to participate in career development events based on the cost & utility factor, therefore, they were willing to put forth the time and effort to participate in career development events because they felt career development events would help them achieve their goals. However, youth coaches should consider using strategies to develop youth self-efficacy to perform the tasks in career development events as it explained 39% of the variance in youth motivation. Coaches should also consider the role interest motivation plays a role as it was highly correlated with self-efficacy.

Keywords: Youth motivation, career development events, instrumentation

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Introduction

Students make choices to decide how they will spend their time in youth activities. Motivation helps youth choose activities in which they participate. Youth typically select activities that incorporate existing interests or hobbies (Csikszentmihalyi & Larson, 1984; Homan, Dick, & Hedrick, 2006; Texas AgriLife Extension Service, 2005) and may influence their career choices. Combined, 4-H and FFA are two large youth development organizations in the United States that reach over 2 million youth. Both of these organizations provide opportunities for youth to develop skills and knowledge through events known as Career Development Events (CDEs). These events are designed to “motivate students and encourage leadership, personal growth, citizenship and career development” (National FFA Organization, 2006, p. 5). Youth coaches advocated CDEs.
were useful to engage students and provide opportunities to learn across multiple agricultural education contexts as learning experiences (Voigt, Talbert, McKinley, & Brady, 2013a). Other researchers found that CDEs focused on animal education develop both life and career skills (Cavinder, Byrd, Franke, & Holub, 2011; Nash & Sant, 2005; Rusk, Martin, Talbert, & Balschweid, 2002). If youth do not see experiences as beneficial, either in reaching a goal or socially connecting with peers, they may stop participating in these activities (Carnegie Council on Adolescent Development, 1992; Lundry, Ramsey, Edwards, & Robinson, 2015). Limited research has investigated youth motivation to participate in activities that build career competencies; particularly, when CDEs are out-of-school, career-building activities with strong competitive aspects (Croom, Moore, & Armbruster, 2005). Competition can provide extrinsic motivation for youth and have positive outcomes for participants, such as higher levels of academic engagement and career self-efficacy (Alfeld et al., 2007). Radhakrishna, Everhart, and Sinansky (2006) reported that youth were motivated to participate in competitive events to increase knowledge, build life skills, and receive recognition. While healthy competition can lead to development of positive life skills, such as goal formulation, team work, and learning how to identify personal capacities and constraints, unhealthy competition can create a hostile or aggressive environment, lead to embarrassment, and be emotionally fatiguing (Johnson, 1993). Fox and Cater (2015) found that “both competitive and non-competitive program delivery models have value in increasing youths’ science interest and competence” (p. 99). Moreover, youth motivation was studied in group of 4-H youth regarding their county fair competition experience (Arnold, Meinhold, Skubinna, & Ashton, 2007). Youth reported that their primary motivation for participation was to have fun. They also ranked goal achievement and self-efficacy as important. Participation for the sake of competition in and of itself was ranked 11th out of 16 motivating factors.

Although several studies have investigated student motivation in multiple educational contexts in agricultural education and several competitive contexts (Fox & Cater, 2015), few studies have looked at why youth chose to participate in CDEs. Other studies have assessed aspects such as coach perception of motivation (Lundry et al., 2015; Russell, Robinson & Kelsey, 2009), value of participation as perceived by parents (Radhakrishna, 2006), and demographics of student participants (Thieman, Bird, Vincent, & Terry, 2010) in CDEs. Russell et al. (2009) reported that coaches motivated students through: (a) building upon the tradition and successes of the FFA chapter, (b) providing competitive opportunities, (c) promotion the potential to gain life skills, (d) providing a fun environment, (e) recruiting students with demonstrated potential success, and (f) making CDEs an integral part of the classroom. It is important to note, this study reported coaches’ perceptions, and the factors reported were primarily externally motivating, or those controlled by the coach, not by the student participants. Lundry and his colleagues (2015) found that high school agriculture teachers agreed that students gained the following skills through CDEs: teamwork, competition, setting and achieving goals, self-motivation and confidence. Croom et al. (2005) found that coaches at National FFA CDEs believed that students participated because of their interest in competition. However, students at the same event indicated that they participated because of the relationship between the event in which they participated and career choice. Further, Lancaster, Knobloch, Jones and Brady (2013) found students participated in CDEs to develop career skills, learn more about an industry and content domain, as well as compete and have fun. This difference between what teachers and students believe clarifies the need to assess motivation directly from a youth participant perspective. To better understand youth participation, it is important to identify motivational factors from the youth’s perspectives (Russell et al., 2009; Talbert & Balschweid, 2004) and determine relationships among youth motivation factors. Jones, Knobloch, and Orvis (2011) found that youth motivation had an important role in developing career-related competencies when participating in a Horticulture CDE. Youth motivation variables of outcome expectancy, self-efficacy, intrinsic value, and utility value were positively related to youth performance in a Horticulture CDE.
Theoretical Framework

Regarding social cognitive theory, Bandura (1986) posits there are personal and environmental factors that can inform one’s decision to participate in voluntary educational activities. For the purpose of this study, environmental factors would include any coaches, parents and/or peers that influence student choices. Because 4-H and FFA are voluntary membership organizations, the researchers of this study assumed that youth were members due to their own interest in the organization and its activities. Although external motivators may influence youth participation, we assumed participation was also informed by personal motivation.

Expectancy-value motivation was used as the theoretical framework to focus on the personal factor (i.e., youth motivation) of the social cognitive theory. Expectancy-value theory (EVT) was chosen because personal expectancies and values of participants can directly influence the decision to participate in a task, the performance of that task, and task persistence, or continuing to engage in the task (Eccles & Wigfield, 2002). The four variables of expectancy-value motivation include: (1) **Attainment Value** - “the personal importance of doing well on a task” and how it speaks to their self-identity; (2) **Cost Value** - the negative aspects of engaging in a task, such as the time or effort required; (3) **Utility Value** - how a task relates to a person’s future goals, such as career goals; and, (4) **Intrinsic Value** - “enjoyment of activity participation, or interest in the activity or task” (Eccles & Wigfield, 2002, p. 120).

Expectancy value theory addresses an individual’s belief in his/her ability to do a task as a construct that informs the decision-making process based on expectancies and task values. More specifically, Bandura’s (1997) self-efficacy theory was used to determine if youth saw themselves capable of successfully performing the challenging tasks in a CDE. Self-efficacy is a personal assessment of one’s ability to successfully perform a task in a specific context. Social cognitive theory proposes that individuals with a greater perception of personal ability to succeed at an activity are more likely to be motivated to participate in that activity, therefore putting effort into doing the task well (Bandura, 1982).

Purpose & Research Questions

The purpose of this study was to validate an instrument developed to assess youth motivation to participate in out-of-school, competitive CDEs. Three research questions guided the study: (1) What were the motivation factors and construct validity of items used as measures regarding youth participation in a CDE? (2) Were the factors of youth motivation reliable? (3) Using the motivation factors, were youth participants motivated to participate in CDEs?

Methods & Procedures

Youth participants in the 12 state level CDE contests in Indiana were the target population for the study. Five CDEs had invitational registrations, and seven of the state level CDEs required teams to successfully compete at an area event to participate in the state contest. Qualification requirements varied by event, with regional variation based on the competitiveness of a particular area in a particular subject matter. The first version of the questionnaire was developed to assess intrinsic, extrinsic, and self-efficacy motivation of youth participants in CDEs (Lancaster et al., 2013). Items were developed through discussions with a panel of contest chairs regarding why they believed youth participated in CDEs, based on what they had heard from coaches and youth regarding why they participated in CDEs during the last five years. Questionnaire items were worded using language for instrument development based on Deci and Ryan’s (1985) extrinsic and intrinsic factors of self-determination motivation and Bandura’s (1997) self-efficacy motivation. The first version of the instrument was field and pilot-tested with a census of participants \((n = 304)\) in State CDEs in three animal science domains: horses, livestock, and poultry and eggs (Lancaster
The instrument consisted of 30 items on a four-point summated rating scale to measure intrinsic, extrinsic, and self-efficacy motivation. The instruments were provided to event chairpersons, who distributed them to participants during a break or at the end of each CDE. Students were aware that they could decline completing the questionnaire with no negative consequence to their contest results (as defined in the approved IRB human subject’s protocol). Data were collected from participants using Scantron sheets and exported from Scantron to Microsoft Excel, coded, and then imported into IBM SPSS for analysis. Demographic information included grade, gender, and participation in other CDEs. Pilot study respondents were 55% female, 36% male, and 9% did not indicate their gender. The grade distribution was 7.5% from 3rd - 6th grade, 20.5% from 7th - 8th grade, 37.8% from 9th - 10th grade, and 34.3% from 11th - 12th grades. Over half of the respondents (54.4%), indicated that this was the first time they were involved in a CDE. Principal component analysis was conducted to test the allocation of items to motivational factors. Four factors emerged from the principal component analysis (PCA): (1) Self-efficacy; (2) interest in careers; (3) intrinsic task value; and, (4) extrinsic task value. Reliability coefficients were computed using Cronbach’s alpha: self-efficacy = 0.82; interest in career activities = 0.91; intrinsic task value = 0.70; extrinsic task value = 0.78.

Following the analysis of the pilot test data from the first version, it was determined that expectancy value theory (Eccles & Wigfield, 2002) was an appropriate theoretical framework for the instrument. Therefore, items were revised or added to align with the factors of EVT. Utilizing EVT allowed researchers to explore negative aspects of task value, which had not been explored in the pilot study. Furthermore, EVT allowed researchers to look at external motivators in a more precise way, by dividing extrinsic motivation into attainment and utility value.

The second version of the instrument was the focus of this confirmatory factory analysis study. It contained 28 items developed to measure youth motivation (8 items to measure intrinsic task value, 5 items to measure attainment, 3 items to measure cost, 4 items to measure utility task value, 8 items measured self-efficacy), and demographic questions for age, gender, years of participation in the current CDE, and participation in other CDEs. Task value constructs were measured by assessing responses to various statements on the instrument that asked students to indicate their level of agreement to statements using the following scale: 1 = None, 2 = A little, 3 = Somewhat, 4 = Quite a Lot, and 5 = A Great Deal. Self-efficacy and intrinsic value motivation questions referring to a specific subject matter were revised to be context specific. For example, the item “I am confident in my ability to answer general questions about [context],” would read “I am confident in my ability to answer general questions about [plants]” for the Horticulture CDE, and would read “I am confident in my ability to answer general questions about [livestock]” for the Livestock CDE. The instrument for each CDE were reviewed for face and content validity by a panel of youth development specialists, including each CDE chairperson. The questionnaire was field and pilot-tested to establish face validity and reliability.

The CDE-specific instrument was distributed to a census of students (N = 2,153) participating in 12 state-level CDEs (Crops, Dairy, Entomology, Forestry, Hippology, Horticulture, Livestock Evaluation, Meats, Poultry and Egg, Livestock Skillathon, Soils, and Wildlife Habitat) that occurred during an academic year. In events where the Blackboard Learning Management System (LMS) was used for contest content, the instrument was incorporated into the LMS and completed at the end of online component of the CDE, instead of using the Scantron sheets. Use of LMS for recording purposes was the only deviation from data collection procedures utilized in the pilot study. The CDEs included were all state-level CDEs with a life science context that were supervised by youth specialists/researchers. Student members of FFA and 4-H youth organizations jointly participated in the CDEs in Indiana.

Study respondents were 47% male and 53% female. Grade distribution was 26% in 8th grade or below, 23% in the 9th grade, 20% in the 10th grade, 17% in the 11th grade, and 14% in the
12th grade. Participation in the CDE the youth were currently attending included the current year’s participation with results showing 39% of participants in their first year at that CDE. Over one-third (44%) of respondents were in their 2nd or 3rd year, 13% in their 4th or 5th year, and 4% had participated in specific CDEs for 6 to 7 years. Half of the participants (50%) reported participating in other CDEs. Representation by CDE was: Crops \((n = 225; 11\%)\); Dairy \((n = 171; 8\%)\); Entomology \((n = 47; 2\%)\); Forestry \((n = 303; 14\%)\); Hippology \((n = 159; 7\%)\); Horticulture \((n = 59; 3\%)\); Livestock Evaluation \((n = 143; 7\%)\); Meat \((n = 198; 9\%)\); Poultry and Egg \((n = 158; 7\%)\); Soils \((n = 342; 16\%)\); Livestock Skillathon \((n = 268; 12\%)\); and Wildlife Habitat \((n = 80; 4\%)\).

Descriptive statistics (i.e., percentages, means, standard deviations) were computed using SPSS. Incomplete responses were excluded automatically by SPSS. Post-hoc Cronbach’s alpha coefficients were computed to determine internal consistency. Pearson’s correlations were used to determine relationships of variables, which were explained using conventions by Hopkins (2000). Effect sizes concerning relationships were calculated using Cohen’s (1988) \(r^2\) and were described by Cohen’s (1988) conventions. Because of the large data set, 20% of the cases were randomly selected \((n = 419)\) as the sample for factor analysis. Although common factor analysis has more restrictive assumptions, it is viewed as being more theoretically based (Hair, Black, Babin, & Anderson, 2009). Maximum likelihood factor analysis with orthogonal rotation was conducted on the 28 motivation items to determine if a set of latent factors represented youth motivation regarding participation in CDEs. Factor loadings of 0.40 or greater were retained (Costello & Osborne, 2005), and four items being removed because of low coefficients. Four factors with eigenvalues equal to or greater than 1.0, including a scree plot, were considered in the analysis. Correlations and factor loading coefficients of 24 items were used to understand the nature and structure of the four factors. The four factor solution was chosen because it parsimoniously explained the most variance with the fewest factors. Appropriateness of the data was determined using the Kaiser-Meyer-Oklin measure of sampling adequacy \((KMO = .93)\) and Bartlett’s test of sphericity \((\text{Sig.} = .00)\).

**Results/Findings**

For the first research question, four factors explained 60.22% of the variance (see Table 1). The order and percent variances each factor contributed to the model were: (1) Self-efficacy \((39.3\% \text{ variance explained})\); (2) cost & utility \((9.21\%)\); (3) intrinsic value \((6.05\%)\); and, (4) attainment \((5.67\%)\). **Attainment** consisted of three items, which represented if youth valued the outcome expectations of being with friends, seeing new places, and responding to expectations of parents and their coach. **Cost & utility** consisted of seven items, which represented if youth were willing to spend time preparing for the CDE and spending a Saturday at the CDE and four items which represented youth’s value of tasks that would help them reach future goals such as gaining confidence, enjoying competition, learning career skills, and being more competitive for scholarships and awards. **Intrinsic value** consisted of six items, which represented youth’s interest in learning, working, and pursuing a career in the context related to the CDE. **Self-efficacy** consisted of eight items, which represented confident in a youth’s ability to perform tasks related to the context of the CDE. Students identified most with cost and utility motivation, which reflects they felt the CDEs were useful to helping them achieve their goals and they were willing to put forth the effort to participate.
Table 1

*Frequencies and Factor Loadings from Confirmatory Factor Analysis of the Youth CDE Motivation Participation Scale (n = 419)*

<table>
<thead>
<tr>
<th>Items</th>
<th>Factor Loading</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attainment (3 items)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AT_1: My friends were participating</td>
<td>.64</td>
<td>42%</td>
</tr>
<tr>
<td>AT_2: My parents/guardians wanted me to participate</td>
<td>.49</td>
<td>40%</td>
</tr>
<tr>
<td>AT_3: My coach encouraged me to be on the team</td>
<td>.66</td>
<td>51%</td>
</tr>
<tr>
<td><strong>Cost &amp; Utility Value (7 items)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C_1: I was willing to take time to study alone</td>
<td>.59</td>
<td>56%</td>
</tr>
<tr>
<td>C_2: I was willing to take time to study with team</td>
<td>.55</td>
<td>75%</td>
</tr>
<tr>
<td>C_3: I was willing to come on a Saturday</td>
<td>.46</td>
<td>65%</td>
</tr>
<tr>
<td>UT_2: Want to learn something new</td>
<td>.72</td>
<td>75%</td>
</tr>
<tr>
<td>UT_3: Enjoy competition</td>
<td>.58</td>
<td>73%</td>
</tr>
<tr>
<td>UT_4: Want to be more competitive for scholarships/awards</td>
<td>.61</td>
<td>70%</td>
</tr>
<tr>
<td>UT_5: Want to develop career skills</td>
<td>.61</td>
<td>73%</td>
</tr>
<tr>
<td><strong>Intrinsic Value (6 items)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN_1: Interested in learning about [context]</td>
<td>.68</td>
<td>62%</td>
</tr>
<tr>
<td>IN_3: I like [context]</td>
<td>.52</td>
<td>67%</td>
</tr>
<tr>
<td>IN_4: Interested in a career in [context]</td>
<td>.73</td>
<td>35%</td>
</tr>
<tr>
<td>IN_7: I am interested in working in [context]2</td>
<td>.44</td>
<td>26%</td>
</tr>
<tr>
<td>IN_8: I am interested in working in [context]3</td>
<td>.64</td>
<td>38%</td>
</tr>
<tr>
<td>IN_9: I am interested in [context] as a lifelong hobby</td>
<td>.69</td>
<td>57%</td>
</tr>
<tr>
<td><strong>Self-Efficacy (8 items)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE_1: I am confident in my ability to answer general questions about [context]</td>
<td>.66</td>
<td>54%</td>
</tr>
<tr>
<td>SE_2: I am confident in my ability to answer questions about [context] anatomy/characteristics</td>
<td>.70</td>
<td>43%</td>
</tr>
<tr>
<td>SE_3: I am confident in my ability to answer questions about [context] 1</td>
<td>.67</td>
<td>42%</td>
</tr>
<tr>
<td>SE_4: I am confident in my ability to answer questions about [context] 2</td>
<td>.63</td>
<td>37%</td>
</tr>
<tr>
<td>SE_5: I am confident in my ability to identify [context] 1</td>
<td>.59</td>
<td>58%</td>
</tr>
<tr>
<td>SE_6: I am confident in my ability to identify [context] 2</td>
<td>.71</td>
<td>57%</td>
</tr>
<tr>
<td>SE_7: I am confident in my ability to choose the most [context]1</td>
<td>.74</td>
<td>45%</td>
</tr>
<tr>
<td>SE_8: I am confident in my ability to choose the most [context]2</td>
<td>.68</td>
<td>46%</td>
</tr>
</tbody>
</table>

*Note:* Frequencies represent: 4 = “Quite a Lot” & 5 = “A Great Deal.”
Table 2

**Descriptive Statistics and Correlations between Items and Factors of the Youth CDE Motivation Participation Scale (n = 419)**

<table>
<thead>
<tr>
<th></th>
<th>Attainment</th>
<th>Cost &amp; Utility Value</th>
<th>Intrinsic Value</th>
<th>Self-Efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT_1</td>
<td>.75</td>
<td>.21</td>
<td>.20</td>
<td>.18</td>
</tr>
<tr>
<td>AT_2</td>
<td>.77</td>
<td>.40</td>
<td>.25</td>
<td>.25</td>
</tr>
<tr>
<td>AT_3</td>
<td>.81</td>
<td>.30</td>
<td>.21</td>
<td>.21</td>
</tr>
<tr>
<td><strong>Attainment</strong></td>
<td><strong>1.00</strong></td>
<td><strong>.39</strong></td>
<td><strong>.28</strong></td>
<td><strong>.28</strong></td>
</tr>
<tr>
<td>C_1</td>
<td>.23</td>
<td>.73</td>
<td>.47</td>
<td>.40</td>
</tr>
<tr>
<td>C_2</td>
<td>.27</td>
<td>.70</td>
<td>.35</td>
<td>.36</td>
</tr>
<tr>
<td>C_3</td>
<td>.26</td>
<td>.64</td>
<td>.31</td>
<td>.29</td>
</tr>
<tr>
<td>UT_2</td>
<td>.31</td>
<td>.76</td>
<td>.37</td>
<td>.34</td>
</tr>
<tr>
<td>UT_3</td>
<td>.24</td>
<td>.67</td>
<td>.28</td>
<td>.39</td>
</tr>
<tr>
<td>UT_4</td>
<td>.32</td>
<td>.71</td>
<td>.31</td>
<td>.37</td>
</tr>
<tr>
<td>UT_5</td>
<td>.31</td>
<td>.72</td>
<td>.43</td>
<td>.43</td>
</tr>
<tr>
<td><strong>Cost &amp; Utility</strong></td>
<td>--</td>
<td><strong>1.00</strong></td>
<td><strong>.51</strong></td>
<td><strong>.50</strong></td>
</tr>
<tr>
<td>IN_1</td>
<td>.18</td>
<td>.47</td>
<td>.79</td>
<td>.56</td>
</tr>
<tr>
<td>IN_3</td>
<td>.25</td>
<td>.51</td>
<td>.71</td>
<td>.57</td>
</tr>
<tr>
<td>IN_4</td>
<td>.25</td>
<td>.37</td>
<td>.85</td>
<td>.60</td>
</tr>
<tr>
<td>IN_7</td>
<td>.25</td>
<td>.35</td>
<td>.70</td>
<td>.46</td>
</tr>
<tr>
<td>IN_8</td>
<td>.20</td>
<td>.38</td>
<td>.80</td>
<td>.49</td>
</tr>
<tr>
<td>IN_9</td>
<td>.18</td>
<td>.33</td>
<td>.81</td>
<td>.58</td>
</tr>
<tr>
<td><strong>Intrinsic Value</strong></td>
<td>--</td>
<td>--</td>
<td><strong>1.00</strong></td>
<td><strong>.69</strong></td>
</tr>
<tr>
<td>SE_1</td>
<td>.21</td>
<td>.40</td>
<td>.57</td>
<td>.78</td>
</tr>
<tr>
<td>SE_2</td>
<td>.22</td>
<td>.42</td>
<td>.59</td>
<td>.81</td>
</tr>
<tr>
<td>SE_3</td>
<td>.20</td>
<td>.37</td>
<td>.57</td>
<td>.80</td>
</tr>
<tr>
<td>SE_4</td>
<td>.25</td>
<td>.37</td>
<td>.55</td>
<td>.78</td>
</tr>
<tr>
<td>SE_5</td>
<td>.19</td>
<td>.42</td>
<td>.44</td>
<td>.73</td>
</tr>
<tr>
<td>SE_6</td>
<td>.23</td>
<td>.43</td>
<td>.49</td>
<td>.80</td>
</tr>
<tr>
<td>SE_7</td>
<td>.21</td>
<td>.39</td>
<td>.59</td>
<td>.82</td>
</tr>
<tr>
<td>SE_8</td>
<td>.23</td>
<td>.37</td>
<td>.54</td>
<td>.78</td>
</tr>
<tr>
<td><strong>Self-Efficacy</strong></td>
<td>--</td>
<td>--</td>
<td>--</td>
<td><strong>1.00</strong></td>
</tr>
<tr>
<td>Mean</td>
<td>3.20</td>
<td>3.93</td>
<td>3.30</td>
<td>3.38</td>
</tr>
<tr>
<td>(SD)</td>
<td>(1.07)</td>
<td>(.79)</td>
<td>(1.02)</td>
<td>(.95)</td>
</tr>
</tbody>
</table>

*Note.* Pearson’s correlation coefficients were reported; Scale: 1 = None, 2 = A little, 3 = Somewhat, 4 = Quite a Lot, and 5 = A Great Deal.
For the second research question, reliability coefficients were computed using Cronbach’s alpha to determine if the four factors were reliable among the sample (n = 416). The three of the four factors had reliability coefficients greater than 0.70, which were considered acceptable (George & Mallery, 2003). Reliabilities for individual factors were: Attainment = 0.68 (3 items); Cost & Utility = 0.83 (7 items); Intrinsic = 0.87 (5 items); Self-efficacy = 0.91 (8 items). Moreover, correlations of all factors and items meeting reliability and factor analysis criteria were further analyzed to determine convergence and divergence of factors (see Table 2). The three attainment items had very large relationships with the attainment factor. The seven cost & utility items had high and very large relationships with the cost & utility value factor. The six intrinsic items had very large relationships with the intrinsic value factor. The eight self-efficacy items had very large relationships with the self-efficacy factor. The relationships among factors were also computed. There were four relationships that had a medium or large effect size. The factor cost & utility had a medium relationship with the attainment factor, and high relationships with the intrinsic factor and the self-efficacy factor. Finally, the intrinsic factor had a high relationship with the self-efficacy factor.

For the third research question, means and standard deviations were computed for the four factors to determine if youth were motivated to participate in CDEs (see Table 2). Overall, the youth participants were somewhat motivated to quite a lot regarding the four motivation factors to participate in CDEs. First, youth were motivated quite a lot regarding cost & utility (M = 3.93; SD = .79), which meant they believed the time and energy required to participate would be assist them in reaching their personal and career goals. Over two-thirds of the participants agreed “quite-a-lot” and “a great deal” with four of the seven items representing this factor (Table 1). Second, youth were somewhat self-efficacious (M = 3.34; SD = .95) to perform the tasks in the CDEs. Third, youth were somewhat intrinsically motivated (M = 3.29; SD = 1.02) to participate in the CDEs, which meant they were somewhat interested in learning about the tasks and contexts regarding the CDEs. Finally, youth were somewhat motivated to participate in CDEs because of attainment (M = 3.20; SD = 1.07), which meant they participated because of their friends, parents, or coaches.

Conclusions & Implications

There were three conclusions from the results of this study. First, four factors explained a majority of youth motivation to participate in CDEs. The four motivation factors, in order of importance were self-efficacy, cost & utility, intrinsic value, and attainment. These four factors supported Eccles and Wigfield’s (2002) expectancy-value motivation theory. Eccles and Wigfield (2002) purported expectancies and values are informed by task-specific beliefs including one’s goals and perceptions of competence and difficulty of various tasks. For example, CDEs provide students opportunities to apply knowledge and skills in specific career areas such as animal sciences, horticulture, and wildlife and natural resources (Beekley & Moody, 2002; Lundry et al., 2015; National FFA Organization, 2006). Students perceived the relevance of the career-specific tasks (Croom et al., 2005) and the extent they are confident in their abilities to successfully perform the tasks (Arnold et al., 2007). Factors of cost & utility value and self-efficacy from this study were aligned with the educational purpose and student motivation to participate in CDEs. Specifically, over 70% of the youth strongly agreed (aka, “quite a lot and a great deal”) that they wanted to learn something new, be more competitive for scholarships and awards, develop career skills, and enjoy the competition. This supported Arnold and her colleagues’ (2007) finding that youth participated in local competitions because of enjoyment and goal achievement.

Second, youth were motivated to participate in CDEs, and they were most motivated by cost & utility value. Although youth reported they were motivated to participate in CDEs based on self-efficacy, intrinsic value, and attainment, their highest level of motivation was cost & utility value. Although cost and utility value items loaded on the same factor, Eccles and Wigfield (2002)
differentiate cost from utility value. Cost focuses on the negative aspects of doing a task such as the effort one would need to expend rather than doing another task. These items included asking youth about their willingness to study and prepare for an event, both with team members and alone, as well as their willingness to come on a Saturday to participate in a state-level CDE. As youth have more opportunities to participate in extra-curricular activities, cost becomes an increasingly important motivator. It is not surprising that in this population, cost is relatively high. Youth self-selected to in a Saturday event also knowing that this could result in additional Saturday event if the team advanced to the state-level. In comparison, utility value aligns with how well a task is perceived to help one achieve a current or future goal. Eccles and Wigfield (2002) suggested that utility value reflects a more extrinsic motivation for engaging in a task. As we consider why cost and utility value items loaded on the same factor, perhaps youth evaluated the opportunity to participate in a CDE as a cost-benefit decision. The students likely weighed giving up time to do an alternative activity and what the benefits might be if they participated in a CDE. The benefits reflected how the CDE might help them achieve their current and future goals (Carnegie Council on Adolescent Development, 1992) regarding learning more about a specific topic and advancing their career interests (Lancaster et al., 2013; Lundry et al., 2015). As such, we consider the cost and utility value factor as a combined motivation that reflect a cost-benefit extrinsic motivation. Moreover, gaining more knowledge and development of career skills were the two highest scoring items in this factor. In Indiana, these events are clearly defined as Career Development Events (not judging contests), with a purpose to “motivate students and encourage leadership, personal growth, citizenship and career development” (National FFA Organization, 2006, p. 5). It is likely that the purpose and potential benefits of CDEs are clearly understood by students when they make a decision to participate. Furthermore, studies examining participants of CDEs (Cavinder, et al., 2011; Lancaster et al., 2013; Nash & Sant, 2005; Rusk et al., 2002) reported that participants believed these activities assisted them in developing life skills and career opportunities. This study supported previous studies, and participants in this study were informed of the purpose and benefits of CDEs, either through communication with coaches, adult alumni, or peers. Many coaches of CDEs are former CDE participants themselves, and they communicate the importance of the CDE experience for growth and development (Voigt, Talbert, McKinley, & Brady, 2013b). In addition to coaches, alumni at educational camps and events interact with youth and share the benefits of participating in CDEs, which would inform youth to believe that participation in a CDE would help them in attaining their goals. 

Finally, self-efficacy was the most contributing factor to youth motivation and it was highly related to intrinsic value and cost & utility value motivation. This conclusion supported Bandura’s (1997) theory that individuals participate in a task in which they feel they can be successful, and previous studies (Alfeld et al., 2007; Arnold et al., 2009) that competition can develop youth self-efficacy. It is important to note that for this measure youth were asked about their confidence prior to knowing how they performed in the event. Youth in a particular event may also have had relatively high self-efficacy because for many of the events, they had to qualify at a district contest to be able to participate in the state contest. Therefore, youth had already experienced some level of success. Coaches also spend a lot of time with their youth discussing and teaching the content of the CDE, which may relate to high youth self-efficacy. 

Eccles and Wigfield (2002) mentioned more research is needed to better understand the links between expectancies and values. This study demonstrated relationships between expectancies (attainment and self-efficacy) and values (intrinsic and cost & utility). Attainment and cost & utility value were related. Both factors reflect extrinsic reasons why they might participate in CDEs. For example, youth may participate in a CDE because their coach expected them to participate (attainment) and youth likely assessed the opportunity and considered the cost-benefit decision to participate (cost & utility value). Furthermore, self-efficacy was highly related to cost & utility value and intrinsic value. This suggests that youth self-efficacy to participate in CDEs is
informed by both external and internal motivations. Bandura (1997) stated that there are four sources of self-efficacy—mastery experiences and physical and psychological affect are internal sources of control, whereas vicarious experiences and verbal persuasion are more external sources of control. Regarding youth motivation to participate in CDEs, self-efficacy was highly related to intrinsic value, which reflects youth were driven by interests and enjoyment in performing the tasks. Additionally, self-efficacy was highly related to costs & utility value, which reflects the youth were driven by seeing relevance in participating in the CDEs because it was worth their time in learning more about a specific-domain and possibly helping them achieve their career goals. Lancaster and her colleagues (2013) found that students’ motivation varied among different animal science-related CDEs (i.e., horse and pony; livestock; poultry).

**Recommendations**

This research adds to the body of knowledge by confirming a valid and reliable instrument that can be used to assess youth motivation in career development events in the context of agricultural CDEs. Moreover, expectancy value and social cognitive theories were found to be relevant theoretical frameworks for examining youth motivation to participate in CDEs. Although the results of this study provided evidence that the Youth CDE Motivation Participation Scale was a valid and reliable measure of youth motivation to participate in CDEs, limitations should be addressed in future studies. Particularly, attainment and cost variables should be explored. Future studies may identify additional items for attainment, which was represented by three items in this study. For example, relevant statements that reflect “the personal importance of doing well on the task” (Eccles & Wigfield, 2002, p. 119) should be identified for attainment. Exploring FFA and 4-H youth schemas, especially through semi-structured interviews, could help researchers identify additional items for attainment as youth may consider performing well in a specific career-related competition as part of their ideal self-identity (Eccles & Wigfield, 2002).

The target audience for this research was the population of students participating in a state CDE in each domain. By their presence, the youth indicated a willingness to bear the time and effort costs of participation. Cost items did not address monetary cost for participation, or costs in regards to other activities which were prioritized below the CDE. Also, youth who were not willing to bear the time cost for participation chose not to participate, and therefore were not participants in the study. Moreover, the convenience sample may be biased toward youth being more motivated they advanced to a state level competition. This is an opportunity for future research studies to focus on motivation of youth who do not participate in CDEs. Future studies should investigate if cost varies by level of competition and if it is a predictor of success in CDEs. Finally, cost and utility value loaded as a single factor in this study. Future studies should investigate the relationship between cost and utility value, and their influence on youth motivation to participate in CDEs.

A unique aspect of this research is that it assessed CDEs as a holistic learning experience, regardless of the CDE-related domain. Most research conducted on CDEs has been domain-specific (Cavinder et al., 2011; Jones et al, 2011; Nash & Sant, 2005; Rusk, et al., 2002; Thieman et al., 2010; Voigt et al., 2013a; Voigt et al., 2013b). The instrument had items that were populated with specific names of CDEs so it could be used across a variety of CDEs. Future studies should focus on the analysis of similarities and differences in youth motivation across different domains to help educators better understand why youth participate, and if motivation is different because of the nature of specific CDEs (e.g., Lancaster et al., 2013).

Further, researchers may consider exploring differences in youth motivation at local, district, state and national levels. Although this study focused on the state level, motivation may vary across different levels and the extent youth may have developed mastery of a CDE. For example, one might expect that self-efficacy would be higher as youth advance to higher levels of competition because of mastery experiences and assuming they learn coping strategies to self-
regulate negative emotions such as nervousness. Future studies should compare motivational factors to performance in CDEs to determine which factors are predictors of performance. Based on Bandura’s (1997) social cognitive theory, one would expect high levels of self-efficacy to be related to high levels of task competency.

Finally, future research should explore what components of the learning experience (e.g., coaching strategies, self-regulation, learning resources) influence motivation. CDEs are activities that have a high level of student involvement, but limited research has been conducted to understand why students participate. Other studies have reported that youth have increased life skills upon completion of a CDE (Cavinder, et al., 2011; Nash & Sant, 2005; Rusk et al., 2002). However, little research has addressed how to increase youth engagement in these activities. State supervisors, youth development specialists, and CDE coaches can be more effective if they can purposefully motivate youth to participate in out-of-school competitive career development events to develop life skills that are aligned with the goals and purposes of FFA and 4-H programs. A better understanding of why youth participate in CDEs would assist coaches in recruitment and retention of youth into a CDE and possibly active engagement in the Agricultural Education/FFA or 4-H Youth Development program.

References


Consideration of Agricultural Education as a Career: A Statewide Examination by High School Class Year of Predicting Factors

Erica B. Thieman¹, David M. Rosch², and Cecilia E. Suarez³

Abstract
The shortage of teachers in Illinois is reflective of a recent trend where agricultural education graduates of in-state post-secondary institutions have not met the need for the number of available teaching positions. The retirement of the many teachers from the Baby Boomer generation is looming over the profession, making recruitment efforts essential (Illinois Board of Education Report, 2014). With secure funding sources of higher education dwindling, efficiency and effectiveness of recruitment efforts are critical if agricultural education is to continue to survive and thrive by facilitating a steady stream of highly qualified teacher candidates into the field. The purpose of this study was to examine factors influencing high school student consideration of agricultural education as a future career. We included students in grades 9 through 12 (n = 817) from 56 different agricultural education programs. Within the overall sample, parental support and a student’s report of their agriculture teacher emerged as the most powerful predictors, while noteworthy differences arose across class years. These findings possess significant implications for the timing and focus of recruitment efforts.

Keywords: secondary agricultural education, career choice, college recruitment, teacher recruitment, FFA, youth development

Introduction
The shortage of teachers in Illinois is reflective of a recent national trend where agricultural education graduates of in-state post-secondary institutions have not met the need for the number of available teaching positions. This shortage has resulted in multiple program closures when boards of education could not find suitable candidates to fill open positions. The number of annual retirees is forecast to increase as more baby boomers have indicated they plan to retire soon, with nearly one-fourth of all teachers in the state being over the age of 50 (Illinois Board of Education Report, 2015). A group gathered to address this problem, by discussing the implications and proposing possible solutions in 2014. This group included researchers in the current study, post-secondary institutions offering agriculture or agricultural education, secondary teachers, state agricultural education staff, state FFA staff, and agricultural industry professionals.

1 Erica Thieman, University of Illinois at Urbana-Champaign, Agricultural Education Program, 905 S. Goodwin Ave, 174 Bevier Hall, MC-180 Urbana, IL 61801. Email: Thieman@illinois.edu. Phone: 217-244-3863.
2 David Rosch, University of Illinois at Urbana-Champaign, Agricultural Education Program, 905 S. Goodwin Ave, 174 Bevier Hall, MC-180 Urbana, IL 61801. Email: dmrosch@illinois.edu. Phone: 217-244-2134.
3 Cecelia Suarez, University of Florida, Department of Agricultural Education and Communication, 305 Rolfs Hall P.O. Box 110540 Gainesville, Florida 32611-0540. Email: ccsuarez7@gmail.com, Phone: 352-273-2574
This group determined the development of a robust pipeline for the profession to assure an adequate supply of agricultural educators was to be their primary effort; this decision was in response to the closure of two long-standing secondary programs in the state when no suitable candidates were found to fill the positions. The observation of pipeline, or supply, problems are found in the number individuals who do not have full licensure obtained through an accredited teacher certification program occupying agriculture teacher positions. In 2015, approximately one-fourth of the Illinois agricultural educators was provisionally certified (Illinois Board of Education Report, 2015). Industry professionals participating in the discussion indicated the problem in Illinois is larger than just agricultural education, through describing the difficulty in filling open positions due to a shortage of agriculture graduates from post-secondary institutions. Similarly, the USDA indicated that in 2013, graduates with degrees in the agricultural and natural resources sector number approximately half (53%) of those needed to fill the positions available in the industry (Goecker, Smith, Smith, & Goetz, 2010). Secondary agricultural education programs are essential to provide exposure to the broad array of career paths available in agriculture.

The group began to direct special effort to recruit agricultural educators at both the secondary level and from within the agricultural industry, an endeavor supported by recent agricultural education research (Dyer & Breja, 2003; Lawver & Torres, 2012). When the group initiated this effort, they determined it was essential to gather data that would help decide where efforts specifically should be directed to make the most efficient use of limited time and financial resources. To determine where funds could be allocated or reallocated best within the next academic year, it was necessary to identify the specific factors within the agricultural education system strongly associated with a student’s consideration of agricultural education as a career (Lawver & Torres, 2012). A focus on current high school students who are in the midst of making decisions about their higher education to yield more accurate information when compared to interviews of current college students reflecting on their high school experiences.

Agricultural educator recruitment efforts currently exist and have steadily increased given the current shortage of certified teachers on both a state and national level. The challenge of recruitment for future agricultural educators is well-documented and longstanding (Kantrovich, 2007). The retirement of the many teachers from the Baby Boomer generation looms over the profession, making recruitment efforts essential (Illinois Board of Education Report, 2015). With secure funding sources of higher education dwindling, a critical need exists to increase the efficiency and effectiveness of recruitment efforts. Therefore, this study focuses on the factors that are associated most closely with a high school student’s decision to consider agricultural teaching as a profession.

Review of Literature

Several factors contribute to individuals making a decision as significant as their career choice. Post-secondary education students who have been asked to identify their motivating factors to pursue a career in education and/or agricultural education primarily have considered: perception of the education field as an enjoyable career; the opportunity to help in youth development and work with youth; impact on and service to others; advancement opportunities; and a calling to teach (Elfers, Plecki, St. John, & Wedel, 2008; Harms & Knobloch, 2005; Kyriacou & Coulthard, 2000; Lawver & Torres, 2012; Thieman, Marx, & Kitchel, 2014). High rates of placement for graduates following completion of a degree program heavily depends on the student’s right match with a degree program that will provide them the opportunity for academic success and an avenue to accomplish their professional career goals. High levels of career decision self-efficacy correlate with students' persistence in their chosen major (Nauta, 2007).

When college students at large were asked to identify important factors in their consideration of career options, job stability ranked first, listed as "Very Important" by 77% of the
610 respondents (Elfers et al., 2008). Interestingly, only 43% of these students described teaching as a career that "definitely offers job security." Historically, teaching has been considered a career option with high stability and job security, similar to other necessary public service fields such as nursing (Elfers et al., 2008). The second most important factor identified was the opportunity for intellectual challenge, listed as "Very Important" by 67% of the respondents. The perception of teaching as a career that "definitely offers intellectual challenge" dropped to 32%. Starting salary and earnings also were considered: over one-half of the participants indicated these factors as "Very Important," while less than 10% mentioned teaching as "definitely" offering these things (Elfers et al., 2008). These findings suggest that a majority of university students may already have negative attitudes about an education-related career, and implies a need to study student decision-making related to occupations before enrollment at a post-secondary institution.

High school students overwhelmingly indicate their parents, and specifically their mother, as among the most influential individuals as they make career decisions (Faulkner, Baggett, Bowen, & Bowen, 2009; Marx, Simonson, & Kitchel, 2014; Rocca & Washburn, 2005; Wahl & Blackhurst, 2000). They additionally identify other family members and professionals in consideration of career paths. Gender and gender role expectations also have been found to play a role in career aspirations as early as the second grade, where evidence suggests girls identify a decreased range of occupational aspirations and lower goals for occupational attainment than boys (Wahl & Blackhurst, 2000). On the other hand, socioeconomic status may mediate the role of race and gender in the restriction of career aspirations (Valadez, 1998). Students of color identified knowledge of opportunities in agricultural education; financial stability; and support from family, community, and in professional domains as key components for the selection of a career in agricultural education (Vincent, Henry, & Anderson II, 2012). A recent study of 114 high school juniors and seniors in agricultural education found various components and activities within the agricultural education program possess a moderate influence on career decisions. These included: participation in career development events and leadership contests; state and National FFA Conventions and conferences; leadership workshops; and serving as an FFA officer (Marx et al., 2014).

When considering how individuals make decisions, the factors relevant to their decision-making are important to consider. This study focused on high school students enrolled in agriculture courses and the factors most strongly predictive of their openness to agricultural education as a career. The factors associated with their decision are critical to the agricultural teaching profession; increasing the number of students who consider agricultural education represents an initial step in resolving the national shortage of teachers. Identifying the individuals, events, and activities most predictive of students’ active consideration of agricultural education as a career can lead to more informed decisions regarding where to invest recruitment resources.

**Theoretical Framework**

The theoretical framework applied to this study is the Eccles, Wigfield and colleagues expectancy-value model of achievement (Eccles, 1984; Eccles et al., 1983; Wigfield, 1994; Wigfield & Eccles, 1992, 2000). The model presents a comprehensive, context-based application to explain achievement-related choices, such as of a high school student selecting a future career. Consistent with how Kitchel and Ball (2014) describe the appropriate use of theoretical models for non-experimental designs, the Expectancy-Value Model of Achievement provides the rationale for the relationship between students’ stated career decisions and the factors that support or detract from their choice. Expectancy-value theory models the consideration of individuals, events, and experiences that lead to increased consideration of agricultural education as a career.
Figure 1 shows the Expectancy-value theory of achievement characterized by the influence of personal beliefs regarding expected success and value of activities and one’s context on an individual’s choice, persistence, and performance related to a particular decision (Eccles et al., 1983; Wigfield & Eccles, 2000). The current version of the model displays the direct impact that expectations and values have on an individual’s achievement-related choices. The individual’s perceptions of cultural influences and interpretations of previous experiences influence expectations of success and task value.

Factors studied in consideration of agricultural education as a career for the current study are highlighted in gray on the model in Figure 1. These included specific FFA activities, gender, a perception of the parental opinion of agricultural education as a career, and favorable perception of the agriculture teacher as a role model. The decision to consider agricultural education as a career option represents the achievement-related choice for this study. FFA activities in which the student participated corresponds to “Previous Achievement-Related Experiences” and served as precursors to “Student’s Interpretations of Experience.”

Parents and agricultural educators represent “Socializers” within the model for the current study. The actions and beliefs of these socializers affect a student’s perception of their beliefs, expectations, and attitudes related to the career of agricultural education in addition to gender roles and activity stereotypes. These beliefs also influence the degree to which students begin to develop their schemata of an ideal self, possibly in the image of an agriculture teacher, and construct their self-concept of abilities unique to the role of agriculture teacher while setting short- and long-term goals consistent with this identity. Through an application of the expectancy-value model of achievement motivation (Wigfield & Eccles, 2000) in addressing the current shortage of qualified candidates for secondary agricultural educator positions, we define particular areas of study to examine the motivations of students in considering agricultural education as a career.

**Purpose and Research Questions**

Knowing exactly when, how, and where to invest recruitment dollars and efforts for agricultural educators is critical to the future of agricultural education and the broader field of...
agriculture. As a first step to provide data to help Illinois determine where state-level investment in recruitment resources should occur, the purpose of this study was to examine the factors influencing high school student consideration of agricultural education as a future career. We developed two research questions for the current study to address this purpose:

1. What are the factors that significantly predict high school students’ consideration of agricultural education as a potential career option?
2. How do factors which significantly predict consideration of agricultural education as a potential career option vary by high school grade level?

Methods

Instrumentation
The Illinois Agricultural Education administering body commissioned the current study as part of a larger inquiry to address the current critical shortage of agricultural educators. This portion of the study sought to inform recruitment and retention practices and to establish and maintain a pipeline to develop agricultural educators. The primary goal of the study survey was to obtain data from high school students who could provide a framework and recommendations for future recruitment efforts and funding. A panel of experts (N = 8) comprised of university faculty and graduate students, high school agriculture teachers, and first-year agricultural education students who were FFA members examined the questionnaire for face and content validity. The instrument, administered electronically through Qualtrics, was developed specifically to identify both current and prospective events and structures within the state as avenues for recruitment. The anonymously completed instrument included demographic questions to establish gender, ethnicity, grade level, and high school. The questionnaire asked students if they ever had considered agricultural education as a career and provided a text box to add comments. They also were asked to document their specific career goals. Participants were asked to identify items related to how likely their parents were to support agricultural education as a career choice, using a Likert scale ranging from “highly likely” to “highly unlikely.” Students were asked to complete a checklist of FFA Activities in which they had participated from a selected list. Data collected, but not included in the current study, included parental demographics on career and education level and Supervised Agricultural Experience project information.

The FFA activities listed in the analysis were selected purposively based on high frequencies of student attendance and were designated by the state agricultural education staff as ones who served to recruit future agricultural educators. Activities considered include Chapter FFA Officer, State FFA Convention, National FFA Convention, Career Development Events/FFA Contests, 212 Conference, FFA Leadership Camp, and the STAR Conference. The STAR Conference is a statewide conference designed for high school Juniors and Seniors who have expressed an interest in becoming agricultural educators.

Data Collection
All agriculture education programs in Illinois were invited to participate in this research - researchers sent both an initial informational email and parental information forms providing the opportunity for parents to deny a student participation in the study to all agricultural educators. This email, sent the first week of May in 2014, notified teachers of the aims and goals of the study to improve recruitment for agricultural educators in high school students. Incentives also were described: each school which had at least ten students complete the questionnaire received an entry into a random drawing for one of four $120 gift cards to MyCAERT. One week following the informational email, teachers were emailed the anonymous Qualtrics survey link via a shortened URL to distribute to students who did not have a parent/guardian disallowing participation. Within
the following two weeks, all teachers were sent one reminder email each week, with the survey link closing three weeks following the invitation email.

Participants and Sampling
This statewide study included a sample of students in grades 9 through 12 (n = 817) from 56 different agricultural education programs from all FFA-designated regions of the state. Overall, 18% of agricultural education programs in the state had students complete a questionnaire. Researchers examined the responding sample of students for a diversity of sample including factors such as the size of the program, geographical location, and setting of the school (rural, suburban, urban). The responding sample was found to be representative of the state based on the previously mentioned characteristics. The majority of the programs had between one and ten students completing questionnaires (n = 33, 59%), followed by a range of 11 to 20 completed responses (n = 9, 16%) and a range of 21 to 40 responses (n = 8, 16%), and 11% of the programs having between 41 and 81 completed questionnaires. Within this sample, 54% of students (n = 454) identified as male. Approximately 29% (n = 246) identified as freshmen; 28% (n = 235) as sophomores; 24% (n = 206) as juniors; and 15% (n = 130) as seniors. An additional 4% (n = 30) also identified as being in junior high school and were not included in this research study. Many students (48%, n = 403) indicated participation in at least one Career Development Event; 22% (n = 183) reported being a Chapter FFA Officer; 24% (n = 206) as having attended at least one national FFA convention; 19% (n = 157) as having attended at least one statewide FFA convention; 12% (n = 100) as having attended FFA Leadership Camp; and 18% (n = 154) as having attended a 212 Conference.

We were interested in understanding the degree of parental support as it contributes to high school student career decision-making. When asked if parents and family would be supportive if the student chose to become a teacher in the field of agriculture, 36% (n = 304) reported “definitely yes,” 43% (n = 367) responded “probably yes,” 11% (n = 89) said “probably not,” while 6% (n = 50) responded “definitely not.” Approximately 36% (n = 304) “strongly agreed” that their agriculture teacher served as a role model, while 31% (n = 260) reported “agree;” 17% (n = 145) reported “neither agree nor disagree;” 5% (n = 39) reported “disagree;” and another 5% (n = 46) reported “strongly disagree.”

To measure our central variable of interest, we asked participants if they had ever considered becoming a high school agriculture teacher, resulting in 26% (n = 220) responding “yes” and 69.5% (n = 589) responding “no,” with 4.5% (n = 38) not responding. Students had the opportunity to indicate by open-ended text entry the career they intended to pursue following high school; researchers coded these responses into three categories. The majority (46%, n = 386) indicated they were planning to pursue a career in either agriculture or education, 35% (n = 295) reported a career path not within agriculture or education, and 5% (n = 40) planned to pursue a career in agricultural education.

Data Analysis
The goal of this research study was to examine the factors that significantly predict high school students’ consideration of agricultural education as a potential career option. Therefore, we conducted a series of hierarchical logistic regression analyses. Our dependent variable was a dichotomous nominal variable coded as “Teacher Consideration,” where students responded to the survey item, “Have you considered becoming an agriculture teacher/FFA advisor?” For each analysis, we created a three-step regression. We included only gender as a predictive variable within the first block. Within the second block of variables, we included the degree of parental support and FFA involvement items to determine each item’s unique contribution to students’ consideration and to examine the overall contribution of FFA involvement. Eliminated items included those that did not apply to the particular grade level analyzed. Lastly, to examine the
Thieman, Rosch and Suarez

Consideration of Agricultural Education as a Career:…

contribution of students’ relationship with their agriculture teachers, our third block included the degree to which students considered their agricultural teacher a role model for themselves.

To explore our first and overall research question, our initial analysis included the entire dataset. Our subsequent analyses included a hierarchical logistic regression that included the most relevant FFA-related involvement items using a class-year-specific sample for each grade level to examine the predictive variance across high school grade level.

Results

Factors That Significantly Predict High School Students’ Consideration of Agricultural Education as A Potential Career Option

We conducted a hierarchical logistic regression to examine that extent to which gender, FFA involvement, and parent support predict students’ consideration of agricultural education for a career. Overall results are displayed in Table 1. A student’s gender, the only variable within the first block, predicted approximately 4% of the variance (Nagelkerke’s R-square = .04) in students’ consideration of being an agriculture teacher. Parent support for a student’s decision to become an agriculture teacher and FFA involvement items entered within the second block of variables, independently predicted 24% of the variance in student choice, determined by subtracting the second block Nagelkerke statistic (.28) from the first block statistic. Within the third block, students’ identification of their agriculture teacher as a role model to them independently predicted 4% of the variance in student choice. A Hosmer and Lemeshow Test resulted in a non-significant p-value (.92), indicating a good model fit for the analysis.

Within the model, perceived parental support to become an agriculture teacher, identification of one’s agriculture teacher as a role model, participation in CDE activities, and a statewide Leadership Camp, or a 212 Conference all significantly predicted students’ consideration to become an agriculture teacher themselves. Parent support and identification of one’s teacher as a role model emerged as the most powerful predictors (i.e. largest Wald statistic) within the model that included all students regardless of grade level. For every single step increase in parental support (a 5-step range from strongly disagree to strongly agree), a student’s odds they would consider a career in agricultural teaching increased 195%. For every step increase in identification of one’s agriculture teacher as a role model (a five-step range from strongly disagree to strongly agree), a student’s odds increased 154%. The most powerful FFA related predictor was participation in CDE activities. A student’s report of such participation resulted in a 163% increase in their odds to consider teaching agriculture as a career. Participation in Leadership Camp resulted in a 189% increase; however, participation in such activities was not nearly as widespread within our sample, resulting in smaller Wald statistics.
Table 1

Hierarchical Logistic Regression for Overall Sample

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Variance of Predictive Factors by High School Grade Level

To examine the variance that occurs due to high school grade level, we conducted a series of hierarchical logistical regression analyses similar in structure to the overall analysis indicated above, one for each reported grade level. Each analysis resulted in non-significant Hosmer and Lemeshow tests (p values ranged from .46 to .90), which indicated a good model fit within each grade level.

**Freshmen.** The results from our freshmen analysis are found in Table 2. Our model was not as robust relative to the model for the collapsed sample; it predicted only 28% of the variance (Nagelkerke’s R-squared) compared to 49%. The most significant variable within the model was the degree to which freshmen students identified their agriculture teacher as a role model, while the only other variables that emerged as significant within the model were participation in the 212 Conference and CDE activities. Participating in both activities increased the odds of the students’ report of their consideration to become an agriculture teacher by 250% and 270%, respectively.
Table 2

*Hierarchical Logistic Regression for Freshmen*

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<td>1.74</td>
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**Sophomores.** The results from our sophomore analysis are in Table 3. The model predicted a student’s decision to consider teaching agriculture slightly more powerfully, predicting 35% of the variance. Parental support was the most powerful predictor variable, closely followed by identification of a one’s agriculture teacher as a role model, while service as a chapter officer was the only other significant variable within the model.
Table 3

Hierarchical Logistic Regression for Sophomores

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<tr>
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<td>.004</td>
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**Juniors.** The results from our junior class analysis are in Table 4. The model predicted 33% of the variance in students’ decision to consider a career in agricultural teaching. Parental support remained the most powerful predictor of decision-making, while identification of one’s agriculture teacher as a role model no longer emerged as a significant predictor. Student gender served as the only other significant predictor. As juniors, the odds of women choosing to become an agriculture teacher was 235% higher than men, while student gender independently predicted 9% of the variance within the model.
Table 4

Hierarchical Logistical Regression for Juniors

<table>
<thead>
<tr>
<th>Block 1</th>
<th>β</th>
<th>SE β</th>
<th>Wald’s $\chi^2$</th>
<th>df</th>
<th>p</th>
<th>$e^\beta$</th>
<th>Δ R²</th>
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<td>Leadership Camp</td>
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<td>1.10</td>
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<tr>
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<td>1.61</td>
<td>1</td>
<td>.20</td>
<td>1.23</td>
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</table>

Seniors. The results from our senior class analysis are found in Table 5. The model predicted only 52% of the variance in a student’s decision to consider a career in agriculture – the most of any of our models. Within the model, a student’s gender and participation in Leadership Camp emerged as the two most significant predictor variables, while gender independently predicted 13% of the overall variance. Completing CDE activities, and the report of one’s agriculture teacher as a role model also served as significantly predictive variables. Simply being female increased the odds to consider a teaching career by 706%. Attending Leadership Camp increased one’s chances by fully 2,104%. Participation in CDE activities increased one's odds of considering agricultural education as a career by 459%. For every step increase in identification of one’s agriculture teacher as a role model, a student’s odds increased 187%. One’s reported parental support did not emerge as a significant variable for senior-level students.
Table 5

Hierarchical Logistical Regression for Seniors

<table>
<thead>
<tr>
<th>Block 1</th>
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<th>SE β</th>
<th>Wald’s $\chi^2$</th>
<th>df</th>
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<td>7.06</td>
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</tbody>
</table>

| Block 2       |        |      |                |    |     |     | .35  |
| Parent Support| .41   | .47  | .72            | 1  | .37 | 1.50|      |
| Chapter Officer| -1.60| 1.44 | 1.23           | 1  | .26 | .20 |      |
| State Convention| 1.21 | .93  | 1.70           | 1  | .19 | 3.33|      |
| National Convention| -1.06| 1.34 | .63            | 1  | .43 | .35 |      |
| CDE Participation| 1.53| .80  | 3.69           | 1  | .05 | 4.59|      |
| 212 Conference| .53  | 1.00 | .29            | 1  | .59 | 1.70|      |
| Leadership Camp| 3.04 | 1.10 | 7.74           | 1  | .01 | 21.04|     |

| Block 3       |        |      |                |    |     |     | .04  |
| Teacher Role Model| .93  | .33  | 3.58           | 1  | .05 | 1.87|      |

Discussion and Implications

Our research questions focused on the factors that were most strongly predictive of a high school students’ consideration of agricultural education as their chosen profession. As expected and in support of numerous other studies, parental support of agricultural education as a career was a significant predictor for a student to consider said occupation (Faulkner et al., 2009; Marx et al., 2014; Rocca & Washburn, 2005; Vincent et al., 2012; Wahl & Blackhurst, 2000). These findings suggest a parental education campaign is critical to the recruitment of future high school teachers of agriculture: the student’s perceptions of parental dispositions toward their career choice seem an integral component to change and encourage student orientations toward such a career. These findings highlight the potential need for parents’ inclusion in the recruitment process, and that the sophomore year might be the critical time to involve parents in an informational campaign about agricultural education as a profession. In addition, future studies related to parental perceptions of agricultural education and factors parents use to determine how to counsel their student(s) in future careers could serve to further elucidate a model of student career choice.

Students’ perception of their agricultural teacher as a role model also served as a powerful predictor, supporting previous literature findings that the agriculture teacher influences a student’s choice of agricultural education as a college major (Hillison, Camp, & Burke, 1986; Marx et al., 2014). Such perceptions outweighed all FFA-related activities within the aggregated student population in predicting openness to teaching agriculture as a profession. This finding further emphasizes the need for teacher education programs and for those in charge of educator professional development to provide skill building in the interpersonal and affective domains of teaching agriculture. Agricultural educators must build positive, impactful relationships with students which can be the catalyst for a student to follow in their agriculture teacher’s footsteps (Wigfield & Eccles, 2000).
Participation in specialized leadership conferences emerged as a significant predictor for students to consider agricultural education careers, also per previous findings (Marx et al., 2014). Expectancy-value theory posits that these past experiences are essential in how a student develops positive affect toward a career as they consider their options (Wigfield & Eccles, 2000). The FFA experiences most significant to a student’s consideration of a career in agricultural education included attending the 212 Conference, Leadership Camp, and the [AGED] Conference. The review of where to allocate more resources and time should examine these specific events to determine if they can be made more robust and potentially allow more students to participate, as all three conferences have had waiting lists for several years. This review is especially noteworthy, as our results suggest these experiences may be most predictive for freshmen and sophomores. Further investigation of these events could help determine the factors that contribute to effectiveness to ensure those components remain in the programming.

The agricultural experience within our model that served as the most powerful predictor was participation in career development events, which was previously identified as a powerful influence on career decision-making (Marx et al., 2014). Given these findings, agriculture teachers should be encouraged to structure their career development event selection system in a manner that can include as many students as possible, rather than as closed systems wherein only a small number of students participate. State staff and teacher educators can play a role in this process, providing programming on best practices for inclusion and recruitment of students for career development event participation.

It may be important to note that parental support did not emerge as a significant predictor in freshmen and seniors. This finding has not been reflected in other studies, although those failed to disaggregate data by grade level. It may be possible that parents of freshmen have not begun to discuss career options with their children explicitly. Moreover, seniors already may have solidified their career choices, reducing the influence of parents in predicting such choices. The findings from this study suggest that the provision of parental education during the freshmen year could be beneficial, particularly in keeping students open to the consideration of a career in teaching agriculture.

A final significant finding was that gender served as a much more powerful predictor of a student’s decision to consider instruction in agriculture for juniors and seniors than it was for freshmen and sophomores. The older the students were, the less likely boys considered it as a career option. By the time students reached their senior year, many more girls remain open to teaching agriculture than boys, even controlling for variation in parental support, perceptions of their current agriculture teacher, and participation level within a variety of co-curricular experiences related to the agriculture classroom. These results suggest that recruitment efforts that fail to focus on boys prior to their senior year may not maximize their potential effectiveness. While boys represent over half of the sample within this study; only a small minority of senior boys remain open to agricultural education as a career.

Overall, the findings suggest that the foundation for decision-making of agricultural teaching as a career begins when students are freshmen, and can be influenced by their involvement level in co-curricular experiences related to the agriculture classroom. Students’ decision-making influences evolve by their sophomore year through the development of their relationship with their agriculture teachers, and by junior year, their openness to consider teaching has mostly ended. By their senior year, students’ gender, for example, is roughly twice as powerful a predictor as their relationship with their agriculture teacher.
Limitations and Future Research

Limitations of the study are the inclusion of only one state in the study - expanding this study would be prudent, as every state and region is a unique context. In addition, a more purposeful sampling technique with stratification for a variety of variables could contribute to a more generalizable data set; our data collection methods, which stemmed from a canvas of all registered programs within a single state, could have included a response bias to our data and therefore our results. Moreover, our use of perceived parental support as our criterion variable might have affected the validity of our results – our investigation was not longitudinal in nature, and therefore we did not collect empirical data investigating real decisions to pursue teaching agriculture. Finally, the study did not examine the ways in which race and socioeconomic status may affect the choice to pursue a career in agricultural education. Socioeconomic status may influence the level of support that parents give to their student when pursuing a career that is considered “high paying” over a choice based purely on interest. The additional focus of race could provide and intersectional examination of how parents and families of color choose to support the pursuit of a career that lacks racial diversity while problematizing the historical role that race plays in land ownership and agricultural in general. The findings of this study could be beneficial to agricultural education programming in other states; however, it is recommended a similar study be undertaken in other states to determine if observation of similar trends occur. With the centralized nature of the National FFA Organization and TeachAG campaign, having data from a national sample would be a definite asset in the identification of the most important factors for recruitment of future agricultural educators. In light of the significance of parental support in the current study, the inclusion of parents of secondary agricultural education students in future studies could provide vital information.

References


Extension Agents’ Perceptions of a Blended Approach to Onboarding

Amy Harder¹, Priscilla Zelaya², and T. Grady Roberts³

Abstract

Extension organizations are challenged to provide onboarding to new employees that is comprehensive and high quality, yet cost-effective. The purpose of this study was to explore Extension agents’ perceptions of participating in an onboarding program that used a blended approach involving face-to-face and online learning components. The objectives were to (a) describe the perceptions of participants in the Fall 2014 cohort, (b) describe the perceptions of participants in the Spring 2015 cohort, and (c) compare the perceptions between the Fall 2014 and Spring 2015 cohort participants. Two focus groups were conducted with participants from each cohort and a cross-case analysis was conducted with the data. Results showed participants were open to the blended approach and liked being able to work asynchronously but desired improvements in quality, communication, interaction, and applicability. A review of the process with greater consideration of, and adherence to, the principles of adult education is recommended.

Keywords: blended approach, extension, onboarding

Introduction

Staff development professionals for Cooperative Extension are commonly challenged to develop, deliver, and evaluate robust onboarding programs for new agents in a cost-efficient manner. Accomplishing a balanced approach to quality and cost calls for innovative educational solutions. In Florida, a desire to improve the quality of our onboarding program without significant additional expense lead us to consider the use of a blended approach (Alonso, López, Manrique, & Viñès, 2005) for professional development.

New agents in Florida have historically been required to participate in an onboarding program comprised of two face-to-face sessions conducted on the main university campus. In the early 2000s, the face-to-face sessions were each 2.5 days and included a teaching practicum during the second session. Budget cuts during the recession caused less funding for professional development and there was pressure to reduce the number of days that new faculty had to spend out of their counties. By 2008, the face-to-face sessions of the onboarding program had been reduced to 1.5 days each and in 2010 the teaching practicum was eliminated.

The changes in format coincided with increased dissatisfaction with the onboarding program from new agents, their supervisors, and state-level Extension administration, although it remains unclear if the relationship was causal. Regardless, the 2014-2016 Strategic Plan developed for the Program Development and Evaluation Center (PDEC) acknowledged the concern with

¹ Amy Harder is an Associate Professor of Extension Education and the Coordinator for the Program Development and Evaluation Center in the Department of Agricultural Education and Communication at the University of Florida, 117B Bryant Hall, Gainesville, FL 32611, amharder@ufl.edu
² Priscilla Zelaya is a recent Doctoral Graduate in Extension Education in the Department of Agricultural Education and Communication at the University of Florida and the Chief Operations Officer of Projects for Haiti, PO Box 140691, Gainesville, FL 32614, priscilla@projectsforhaiti.org
³ T. Grady Roberts is a Professor of Agricultural Education in the Department of Agricultural Education and Communication at the University of Florida, 117C Bryant Hall, Gainesville, FL 32611, groberts@ufl.edu
quality when it called for the use of “input from recent participants and administrators to redesign the format and content of the new faculty orientation program” (PDEC, 2014) as an action step. New efforts to redesign the format and content of the onboarding program began in Summer 2014 and resulted in a plan that called for participants to attend two sessions of face-to-face training, complete modules within an existing online Extension teaching and learning certificate, and develop a draft logic model based on materials viewed and read prior to the first session.

The goals of adopting the new blended approach were to expand the learning opportunities available to new agents, not substantially increase costs to the organization, and provide flexibility for agents to work at their own pace and from home or the office. Adding e-learning appeared to be an ideal solution and was already well-established within the formal curriculum of the university. However, we were keenly focused on the need to monitor and evaluate the response of new agents to the blended approach. Klein and Polin (2012) asserted “there is a serious dearth of information about the actual onboarding activities being used in today’s organizations and the extent to which those activities are meeting their desired aim of facilitating the organizational socialization of new hires” (p. 267). Therefore, this study was conducted to address the dual purposes of improving our own onboarding program while addressing a gap in the literature.

Theoretical Framework/Review of Literature

The genesis of using a blended approach cannot be known for sure, however a comprehensive literature search pointed to the work of Alonso et al. (2005) as a seminal discussion of the topic. They defined blended learning as “learning that mixes various event-based activities: self-paced learning, live e-learning, and face-to-face classrooms” (p. 231). From a theoretical perspective, Alonso et al. proposed blended learning fits well with a social constructivism framework where learners construct their own meaning while actively participating in a social environment (Doolittle & Camp, 1999). Given our focus on new Extension agents, adult learning (Knowles, 1980) is also a relevant framework, especially aspects of self-directed and problem-based learning. In the most recent version of The Adult Learner (Knowles, Holton III, & Swanson, 2015), six key assumptions about adult learning are made. First, adults need to understand why they need to know something before beginning to learn. Second, adults are self-directed and must have choices in their learning. Third, adults have a large amount of life experiences which greatly influence their learning. Fourth, adults seek out learning opportunities to address their immediate problems and come to the learning environment ready to learn. Fifth, adults are problem-centered in their learning. Sixth, adults are primarily, but not exclusively, intrinsically motivated to learn. Effective adult education programs begin by accepting these six assumptions about adult learners.

Alonso et al. (2005) proposed seven key ingredients for successful blended learning:

1. Learning is directed by an instructor.
2. Instructor is available to personalize instruction through email and telephone.
3. Synchronous web-conferencing allows instructors to explain concepts and answer questions.
4. Instructor-learner and learner-learner interaction is facilitated through online chats.
5. Technical assistance is available to help with learning management systems.
6. Learning is assessed.
7. Learners are awarded a certificate or diploma upon completion.

Although anecdotal evidence suggests blended learning approaches are widely used in agricultural and extension education, only limited research has been reported. Conner, Stripling, Blythe, Roberts, and Stedman (2014) examined one particular type of blended learning, the flipped
classroom approach. In a flipped classroom approach the lectures are delivered through web-based narrated lectures and face-to-face time is used for discussion and other activities. Conner et al. (2014) used this approach in an undergraduate teaching methods course in agricultural education, which has similar content and similar students as our onboarding program for new Extension agents. Students appreciated the online lectures, but offered specific suggestions for improving the quality. They also enjoyed the face-to-face sessions, but emphasized class time should not be used to re-deliver the online lectures, but rather focus on interactive and active learning approaches.

Conner, Rubenstein, DiBenedetto, Stripling, Roberts, and Stedman (2014) replicated the earlier study, making changes based on their original results. In this study, students appreciated the ability to work through the online lectures at their own pace and being able to watch them again if needed. Most students valued the active learning that occurred in the face-to-face sessions, but a few students were uncomfortable with the flexibility now offered in class. Overall, students reported they were very satisfied with the blended approach.

Seger (2011) described efforts to use new technologies to deliver extension programming to clientele. Seger (2011) proposed blended learning can be a great tool to reach traditional, current, and future clientele and further claimed blended learning can provide both “high tech” and “high touch” interactions (para. 20). Seger acknowledged Extension administrators and agents face barriers to adopting these new delivery techniques, one of which is their own comfort levels. Training could be one strategy to eliminate this barrier.

Based on the available literature, blended learning can be an appropriate method to deliver an agricultural education teaching methods class to undergraduate students in a formal setting. Blended learning is also a promising extension delivery method, but agents may not be comfortable implementing such an approach. What is not known is if a blended approach could be a good delivery method for delivering training to Extension agents.

Purpose

The purpose of this study was to explore the Extension agents’ perceptions of participating in an onboarding program that used a blended approach. The objectives were to (a) describe the perceptions of participants in the Fall 2014 cohort, (b) describe the perceptions of participants in the Spring 2015 cohort, and (c) compare the perceptions between the Fall 2014 and Spring 2015 cohort participants.

Methods

A qualitative approach was used to investigate the study objectives. Data were collected through focus groups conducted in October 2014 and April 2015. Participants were recruited from the Fall and Spring cohorts of an onboarding program offered to new county and state Extension faculty in Florida. Typically, new faculty complete the Extension Faculty Development Academy within their first six – twelve months of employment. Both cohorts had the same requirements to complete a number of assigned modules within the online teaching and learning certificate, watch a narrated logic model PowerPoint lecture, and create a draft logic model. All Extension faculty have Internet access at work, although the connection speeds vary with faculty in rural areas experiencing the slowest speeds. The Fall cohort met face-to-face for a total of three days. Additional resources from the Dean of Extension were provided to add two days of face-to-face time for the Spring cohort, which enabled the re-establishment of the teaching practicum.

The focus groups were scheduled on-site immediately following the conclusion of the second session of the program. Participation was voluntary and an incentive of free lunch was offered, given the timing of the focus groups at noon. All participants signed informed consents forms in accordance with the IRB regulations of the University of Florida.
Five (of 17) participants from the Fall 2014 cohort and eight (of 15) participants from the Spring 2015 cohort opted to participate in the focus groups. Each focus group lasted approximately one hour. The focus group discussions were audio recorded and then later transcribed by one of the authors.

A moderator’s guide was used by the facilitator of the focus group. Guiding questions asked participants to consider their reactions to the teaching and learning modules, logic model lecture and practice assignment, and face-to-face sessions. Participants were asked to share how those aspects impacted their learning. A final prompt allowed for open-ended feedback regarding the blended approach to instruction.

A cross case analysis is appropriate when analyzing multiple cases (Merriam, 1998). This type of analysis is defined by two stages: a “within-case” analysis and a “cross-case” analysis (Merriam, 1998, p. 194). The first stage allows the researcher to understand the contextual variables of each case, while the second stage may result in the identification of commonalities between the cases. This study consisted of two cases, comprised of the Fall 2014 focus group and the Spring 2015 focus group.

Within-case analysis of each focus group was used to accomplish the first two objectives. The data were categorically divided using constant comparative analysis (Merriam, 1998). Constant comparative analysis is used to compare data in order to draw out recurring themes, sub-themes, and illustrative quotes. The process requires careful comparison between one section of data with another in order to draw out similarities. Codes were used to identify each participant. Following the within-case analysis, the themes and sub-themes of the focus group cases were compared in the cross-case analysis stage. The results of the cross-case analysis are reported for the third objective.

We followed Lincoln and Guba’s (1985) recommended techniques for establishing trustworthiness. Prolonged engagement and triangulation are techniques for establishing credibility, which is one component of trustworthiness. Two of us spent two months working with each cohort, which included three intensive days of training for the Fall 2014 cohort and five intensive days of training for the Spring 2015 cohort, as well as online communications between face-to-face trainings. Triangulation occurred through the recommended “use of multiple and different sources, methods, investigators [sic]” (Lincoln & Guba, 1985, p. 305). The inclusion of data from multiple participants across two cohorts satisfied the use of multiple and different sources. The focus group method was complemented by informal conversations which occurred throughout the duration of each cohort’s training period, as well as data obtained from the formative and summative evaluations of the program completed by each cohort. Finally, we decided to use multiple investigators because we did not want the focus groups to be biased by their familiarity with two of us. As a result, our team included an established expert in teaching and learning who had no prior relationship with the cohort participants.

Member checks were described by Lincoln and Guba (1985) as the most important technique for establishing credibility. Each participant was e-mailed a copy of the transcript from his/her focus group and provided the opportunity to verify the transcription or correct any misinterpretations. Further, each participant received an e-mailed copy of the summarized findings and was asked to provide feedback on our interpretation of the data. Both methods served to further establish the credibility of our research.

Transferability, dependability, and confirmability are also considerations for qualitative research (Lincoln & Guba, 1985). We have provided a detailed description of the training program and the participants to establish context. The extensive use of quotes also contributes to thick description, as required to enable the reader to make transferability judgments. Dependability and confirmability can be established through a formal audit. We have created an audit trail using records that include: (a) raw data in the form of audio recordings, written field notes, and survey
results; (b) data reduction and analysis products organized in Excel; (c) data reconstruction and synthesis products for each case, the cross-case analysis, and final manuscript; and (d) instrument development information in the form of a moderator’s guide.

Merriam (1998) recommended addressing the researcher’s biases to increase internal validity (a recognized corollary to the concept of trustworthiness espoused by Lincoln and Guba (1985)). Our research team recognizes potential biases exist due to our roles as professional educators. Two of us have worked as teachers within the formal K-12 educational system, while the third of us was an Extension agent. At the time of this research, two of us were faculty members while the third researcher was a doctoral student. We all use online courses as a platform for instruction, which may lead to a pro-technology bias. Finally, one of the researchers was assigned new responsibilities to lead the redesign of the onboarding program and another researcher aids with coordination and instruction for the program. We have employed the other techniques to establish trustworthiness to guard against our possible biases.

Findings

Objective One: Fall 2014 Cohort Reactions

The following themes were identified from the Fall 2014 focus group transcription. Coding was used when including direct quotes from the reports. All fall participants are denoted with an “F” followed by a number 1-5.

Online modules allowed flexibility. An overarching theme found within the Fall 2014 focus group was the ability for Extension agents to complete the online modules at times that were complementary to their schedules. They were able “to stop a couple of times, get a couple of phone calls, play it back, play it back, and print it, and [take] some notes” (F3) and then continue the modules. Extension agents felt the online modules offered the convenience of multi-tasking. One agent commented, “I think it was a lot better to do it online because at least I can feel like I can do other things, answer emails” (F4). Agents also commented on the ability to replay sections of the modules to better understand the content. One agent mentioned, “I remember three times I just paused it…but after that it is much easier” (F5). In the event that agents felt as though the content was no longer a novelty for them, they were able to gain a fresh perspective without feeling as though they left the office for something they already knew. One agent noted he/she got the “refresher but still not feel like you drove and got a hotel room and you’re misplaced from your job and family and forced to listen to things that you’ve been doing” (F2).

Content overlap between face-to-face and online modules. The Fall 2014 focus group discussion revealed participants felt as though some of the content was repeated throughout the online modules. One participant commented the information given in one of the online modules was “redundant” (F1) and repeated what the previous module had already gone over. In regards to the face-to-face sessions, some participants in the focus group felt as though the sessions were repetitive of the content they learned within the online modules. One focus group participant mentioned, “I feel like there may have been a chance to spend a little less time on it face-to-face” (F2). A participant noted, “it was completely verbatim what happened [in the] online module” (F4). Their suggestions for future improvement revealed a desire to quickly review the online content and spend the remainder of the face-to-face time “getting into more efficient use of time” (F2).

Low bandwidth connections affected module completion. The online modules created some difficulties for focus group participants with low bandwidth capabilities. One participant noted, “I had to do them at home during the weekend because our Internet is so slow, I couldn’t do that at the office” (F5). The participants with low bandwidth benefitted from the text, which accompanied some of the online modules. Instead of listening to the modules and following the
planned progression, those with low bandwidths chose to read through the lectures, which made it “much easier” (F5).

**Large time gap between online and face-to-face modules.** Participants in the focus group discussion spoke about the difficulty in remembering material they covered in the online modules while they were attending the face-to-face sessions. One participant mentioned having “no recollection” (F1) of the online material due to having completed the modules months prior to attending the face-to-face sessions. Another participant stated that he/she would have liked a notice to “wait until two weeks prior” (F2) to attending the face-to-face sessions to complete the online modules. The participants noted difficulty in processing the face-to-face information because they had completed the online modules months in advance to the face-to-face sessions.

**Unclear online assignment communication.** Online modules had accompanying assignments that needed to be completed prior to the face-to-face sessions. Focus group participants felt the communication of those assignments was difficult to understand. One participant suggested having a list of needed assignments “so that you can do them as you’re doing the module” (F4). The participant went on to note he/she had difficulty finding the appropriate information to help complete the assignments. Others found the directions in the online modules for assignment completion to be “unclear” (F3) and another noted that he/she “had no idea what’s right” (F2) when it came to the directions for the assignments.

**Desire more interactive sessions.** As the participants went into detail about the idea of redundancy in the module content, it became clear the focus group participants felt as though more effort should be placed in making the face-to-face sessions more interactive, in light of the information-heavy online modules. One participant stated, “Keep in mind that the online part is where the detail is and …whenever we are here, we are experiential” (F2). Participants enjoyed face-to-face sessions that used the online module information as well as the assignments in appropriate ways. One participant described a face-to-face session as “not being redundant and giving advice as we were going because he had given appropriate homework to bring in and go over” (F4). Another participant, commenting on the same session, stated, “[presenter] did a lecture PowerPoint but it was just like, these are the important pieces we talked about in the online piece and here are some examples and then we broke out and did a revision” (F1). This approach was positively received and led to participants suggesting, “a five-minute overview rather than an hour overview of the lecture and no experiential” (F1).

**Objective Two: Spring 2015 Cohort Reactions**

The following themes were identified from the Spring 2015 focus group transcription. Coding was used when including direct quotes from the reports. All spring participants are denoted with an “S” followed by a number 1-8.

**Timing of session requirements.** The focus group discussion revealed participants had difficulty with the timing of various session requirements. One participant stated, “later on in the year it would have been more appropriate to get that [Teaching and Learning] certificate done rather than versus, right here and now and I probably would have appreciated it more” (S1). Participants also felt as though the online modules could have been given soon after being hired. One participant commented, “the first two weeks of the job I had a little bit of breathing room where I would have had more time to complete the [online modules]…why couldn’t I have done this that first week?” (S3). Echoing the previous statement, a participant stated, “I do agree that if we would’ve gotten them earlier on when we were probably the first week or two on the job, that I had more down time” (S5). Another participant felt as though the various requirements were “so overwhelming” (S7) in light of other events and requirements at their county offices during the time of the onboarding program.
Need more practice-based information in online modules. Participants discussed their desire to see more practical information reflected in the online modules. Participants felt as though some of the information presented in the online modules was difficult to understand because “it was a lot of theory based stuff” (S6). The participants in the discussion felt as though the purpose of the modules should be to offer tools to apply immediately within their programming and day-to-day practices (S7). Others felt as though the information presented was valuable but did not understand how to put it into practice. One participant noted, “I will attempt to use it but I need to be shown how to and I think that that was missing here” (S8). When discussing their preferences during the online modules, participants noted enjoying creating “lesson plans” (S1, S2), which they felt represented practical means for addressing their programming needs. One participant suggested focusing on administrative aspects of their position in the future, stating, “the learning modules also focused on learning and teaching which is part of our job as 4-H agents but a very large part of our job is administrative and doesn’t touch on that but maybe that could be addressed in the future as well” (S7).

Engaging online modules. While discussing the content of the modules, participants expressed a desire for more interactive online modules. One participant preferred to see the lecturer and suggested, “I don’t want somebody to lecture to me when I can’t see them so maybe more interactive videos” (S3). Another participant, when speaking about the online module structure, stated, “I paused it and read it myself most of the time” (S4). Other focus group participants also mentioned using a similar method in completing the online modules (S5, S3). Lack of engagement caused participants to become distracted and led to “checking email” (S3) during the modules.

Connection between online and face-to-face modules. Participants in the focus group felt as though some presenters at the face-to-face session failed to connect to the information in the online modules. A participant commented, “the presenters at the actual trainings weren’t fully aware of or didn’t relate to what they were doing in person to the modules” (S4). They attributed this apparent lack of linkages as a gap within the overall training. Another participant felt as though the activities and presentations completed in the face-to-face sessions could have “tied back” (S2) to the online modules they had completed. General consensus was seen with multiple participants vocally agreeing to the previous statements.

Clear communication methods. Another theme which emerged from the focus group discussion was the need for a simpler method of communicating online module requirements. Participants noted, “you had to really read and be very careful reading emails from several different people on different dates, different subject lines, to figure out what was expected of us when we got here” (S8). The confusion led to participants feeling unprepared for the face-to-face sessions because they had missed assignment notifications. The same participant later stated, “had I been given a syllabus, you know when I first started I could’ve planned and planned a little better and given myself a little more time” (S8). Another participant noted the emails did not follow a logical progression to help alleviate stress associated with completing assignment requirements. This participant commented, “when I went to go do my homework modules the other day I had to go through multiple emails to find the one with the link on it to go to the modules and I really think its good to have everything organized when the emails are going out” (S4). One participant felt that he/she was not given adequate notice on the requirements of the online modules (S1).

Online material useful. In their discussion, participants noted the “overwhelming” (S3) amount of paper they received during the face-to-face session. Participants felt as though they could have received the same information in a digital format such as “DropBox” (S7). Others felt as though a separate site with files of all the presentation materials and online templates could be “more user friendly” (S3). One participant also stated that “if [they] had just known [they] could go somewhere and click on it and read it” (P4) it would be more conducive to future use in their county positions.
Objective Three: Similarities and Differences between Cohorts

The following themes were identified between the Fall 2014 and Spring 2015 focus groups. Coding was used when including direct quotes from the reports.

Communication methods. Within both focus groups there is an emphasis on the need to improve the methods of communicating the requirements of the online modules. Participants felt the information needed to complete the assignments was difficult to locate as well as unclear in the intention. Unclear communication strategies were identified among the participants. They felt as though multiple emails with “different links” (S8) created challenges to completing necessary tasks prior to the program. Participants felt as though they “had to really read and be very careful reading emails from several different people on different dates, different subject lines, to figure out what was expected” (S2). The unclear nature of the assignment led to some participants feeling as though they had not completed the assignment correctly (F2, F4). A participant went so far as to say they “had no idea what’s right” (F2). Participants felt as though there was not enough communication about the contents of the assignments prior to their due date (S1). Having a central location with assignment requirements was suggested to alleviate the confusion caused by multiple emails.

Engaging sessions. Another similar theme through both focus groups was the emphasis on increasing the presence of engaging sessions during the online and face-to-face portions of the training. Participant discussion focused on increasing the presence of engaging activities during the face-to-face sessions, which would improve their attention and enjoyment of the sessions. For example, a participant expressed the need for face-to-face sessions to be “experiential” (F2). Participants stressed the need to lower the amount of “lecture time” (F4) and increase time for new information and “hands-on” (F4, S1) practice. According the participants, these changes would create opportunities for higher levels of interest and engagement.

Participants desired the sessions to be more engaging by increasing the practicality of the session content. Participants did not want to be told theories, they wanted to be taught “how to” (S8) apply it to their jobs. Participants stated theory based material “was hard to even have to tie it to anything because I hadn’t done anything and so trying to take the information and put it to use at some point wasn’t going to happen” (S6). When discussing their experience creating lesson plans for the program, they remarked how they would use them in their programming upon returning to their offices (S1). In addition to increasing their technical knowledge of programming, the participants felt that a focus on “administrative” (S7) aspects of their jobs during the session would help them to engage. These comments express a desire to make the content of both the online modules and face-to-face sessions appealing to their professional situations.

Connections between online and face-to-face sessions. Both focus groups emphasized the need to modify the topical connections between the online and face-to-face sessions. The participants desired to “apply the knowledge” (S4) from their previously completed online modules in the face-to-face sessions. The participants felt as though the face-to-face sessions were not highly distinguishable from the online modules (F1, F2). One participant noted the face-to-face session was “completely verbatim what happened online module” (F4). The participants suggested reviewing the online material for a short period of time and then moving to “more efficient” (S2) uses of their time. During the course of the conversation, the participants revealed their dissatisfaction with presenters they felt did not adequately review the online material. They felt as though the presenters “didn’t relate it back to what [they] did online so it seems like there was this gap of why did we do the online” (S4) modules. This further emphasizes the desire of the participants for further modification of the connections between the online and face-to-face modules.
Conclusions, Implications, and Recommendations

We sought to assess the possibility of using a blended approach to improve the Florida onboarding program by exploring the perceptions of participants in two cohorts that experienced the blended approach as a pilot. Similarities existed between the focus groups’ largely negative perceptions, but their views were sometimes in direct opposition. The varying personalities of the group members between cohorts is a possible explanation for the different viewpoints but those are also likely attributable to a conscious effort to use evaluation results gathered following the Fall 2014 cohort to improve the experience of the Spring 2015 cohort. Neither group was very positive about the blended approach, particularly the online component. However, the data gathered from the focus groups was specific and detailed, which enabled us to adjust the Extension Faculty Development Academy to strive to maximize the potential of the blended approach.

The Fall 2014 focus group identified several challenges they experienced as a result of the blended approach, such as unclear assignment instructions and bandwidth requirements, and generally disliked the redundancy within the modules and between the modules and face-to-face sessions. The Spring 2015 focus group articulated similar concerns about the need for better communication but felt the instructors did not do enough to connect the face-to-face sessions to the modules. Further, the Spring 2015 focus group had negative views of the modules themselves, finding them to be too focused on theory, boring to watch, and lacking practical application. Contrary to the Fall 2014 focus group, which suggested the modules should be completed soon before the face-to-face sessions, the Spring 2015 focus group felt they would have had more time to work on the modules during their first two weeks of employment. Both focus groups emphasized the need to use the face-to-face sessions for experiential and hands-on activities rather than lecture, which is consistent with the findings of Conner et al. (2014a, 2014b).

Seger (2011) advocated for the use of blended learning as an extension approach, but identified a lack of instructor comfort as a barrier. A lack of instructor comfort and experience may have impacted how effectively the blended approach was implemented. Of the two instructors who assigned online work related to what they taught face-to-face, neither had significant experience using the blended approach. Coordinators of onboarding programs considering a blended approach should ensure all instructors receive appropriate training and support in the use of the approach. We suggest modifying the first ingredient in the list for successful blended learning offered by Alonso et al. (2005) to indicate that learning is directed by an instructor who has been trained to use the blended approach. The remaining six ingredients in Alonso et al.’s (2005) list did not emerge as major themes in either focus group despite varied levels of adherence in the methods used for the Fall and Spring onboarding programs.

The theory of andragogy (Knowles et al., 2015) provides more insight into understanding the concerns articulated by participants. Adaptations to using the blended approach are necessary to better take into consideration the new agents’ need to know why what they are learning is important. Directions for what to do, when, and how should be reviewed for clarity so as to honor the agents’ sense of self-concept by preventing them from feeling lost before they even begin learning. The timing of the online modules should be matched so it coincides with when agents are most ready to learn that information, although it is unclear from the contrasting views offered by the focus groups participants exactly when that timing should occur. It is notable the most positive aspect of the blended approach identified by the focus groups was the flexibility to complete the modules on their own schedules. Finally, greater emphasis needs to be placed on linking the online and face-to-face content to specific tasks and problems, because adults “learn new knowledge, understandings, skills, values, and attitudes most effectively when they are presented in the context of application to real-life situations” (Knowles, Holton III, & Swanson, 2005, p. 67).
References


A Qualitative Examination of Success Factors for Tenure-Track Women Faculty in Postsecondary Agricultural Education

Theresa Pesl Murphrey¹, Summer F. Odom², Valerie McKee³, and Carley Christiansen Wilkens⁴

Abstract

With the growing need for agricultural institutions to provide solutions to global concerns, environmental issues, food security and sustainable agriculture, competent individuals are needed to lead in excellence and innovation. The role of gender in determining success in the workplace has been studied from many perspectives. The purpose of this qualitative study was to document success strategies of women agricultural education faculty in postsecondary education, synthesize these strategies into meaningful and useful suggestions, and review these strategies using the framework of the Theory of Work Adjustment. Data analysis involving a seven step process allowed confirmation of meaning and ensured that all concepts presented were included and accurately represented. The synthesized summary of success factors resulted in three cross-cutting areas: change is inevitable, reflect and prepare, and time management. The remaining concepts were grouped into four primary categories: (a) workplace awareness and expectations, (b) proactive strategies to facilitate success, (c) internal actions, and (d) external actions. Each of these four categories was further divided into context groupings that included: foundation, individual, cooperation, and balance. The findings of this qualitative study are not generalizable, but results can be transferrable and have utility in our field.

Keywords: Postsecondary Agricultural Education; Faculty; Gender; Success Factors

Introduction

With the growing need for agricultural institutions to provide solutions to global concerns, environmental issues, food security and sustainable agriculture, competent individuals are needed to lead in excellence and innovation. With a reported 45% female participation in FFA chapters studied (Lawrence, Rayfield, Moore, & Outley, 2013), a reported “increasing number of female teachers nationwide entering the profession” (Sorensen & McKim, 2014, p.126), and a reported 57.2% female enrollment in undergraduate studies in a College of Agriculture at a large land grant institution (Texas A&M University, 2014), it is critical that women faculty role models exist. Successful women serve as role models to younger women who aspire to the path of leadership (Lennon, Spotts, & Mitchell, 2012). Priority One of the National Research Agenda for Agricultural Education (Doerfert, 2011) calls for the preparation of a scientific and professional workforce that

¹ Theresa Pesl Murphrey is an Associate Professor in the Department of Agricultural Leadership, Education, and Communications at Texas A&M University, 236 Agriculture and Life Sciences Bldg., College Station, TX 77843-2116, t-murphrey@tamu.edu
² Summer F. Odom is an Assistant Professor in the Department of Agricultural Leadership, Education, and Communications at Texas A&M University, 218 Agriculture and Life Sciences Bldg., College Station, TX 77843-2116, summerodom@tamu.edu
³ Valerie McKee is the Center for Leadership Programs Coordinator in the Institute for Food and Agricultural Sciences at the University of Florida, 121 Bryant Hall, Gainesville, FL 32611, vmckee@ufl.edu
⁴ Carley Christiansen Wilkens is the Assistant Trucking Manager for Merschman Trucking Corporation and an Administrative Clerk for Merschman Seeds, PO Box 67, 103 Ave D, West Point, Iowa 52656, carleyjo10@gmail.com
addresses the challenges of the 21st century. In order to prepare this workforce, diverse faculty in departments of higher education, including women, must be recruited and retained.

According to the American Council on Education (2011), the retention of women in tenure-track positions and advancement to full professor as compared to men is low. For faculty starting out in tenure-track positions, the numbers are about even for both men and women. However, the number of associate professors quickly drops to only about 42% for women. Within doctoral institutions, women comprise 29.1% of tenure track positions and men comprise 55.8% of tenure track positions. The remaining faculty (15.1%) come from non-tenure track positions.

Currently, there are few women positioned to step into critical leadership roles in colleges and universities (Airini et al., 2011; The White House Project, 2009). Postsecondary institutions face the challenge of finding qualified and effective leaders who can lead their college or university and take on other leadership positions (Rubin, 2004). One reason given for the lack of prepared leaders is that there are fewer women qualified and positioned to take on these critical roles like provost, vice president, dean, director, and department head (Airini et al., 2011; The White House Project, 2009). Because tenure is often a prerequisite for advancing to leadership positions, many women are at a disadvantage for being considered for these positions (Lennon et al., 2012).

The role of gender in determining success in the workplace has been studied from many perspectives. The journey that women take to achieve career success is different than men due to many factors (Nicholson & West, 1988). Melamed (1996) reports that in order for women to progress to higher levels they have to rely on their merits and show that they have the required skills, abilities and qualifications to be successful at their job. Similarly, the factors of education level and work experience are more likely to benefit women in enhancing their credibility and credentials than men (Melamed, 1996). Adamo (2013) articulated that women within the biological sciences may be negatively impacted in regard to advancement due to timing related to when competition for positions occurs. The ability of women to compete may be impacted by geographic mobility, financial constraints, or time constraints due to children or a partner (Adamo, 2013). Challenges are also articulated within the secondary agricultural education environment in which female agricultural educators reported having to “prove their ability” (p. 17), deal with stereotyping, and handle the high stress environment (Baxter, Stephens, & Thayer-Bacon, 2011).

Gender discrepancies in academia have been highlighted in recent literature. According to The White House Project (2009), women make up 57% of all college students but only 26% of full professors, 23% of university presidents, and women account for less than 30% of college and university board members. The average percentage of women leaders in academia is 24.5%; whereas, the average percentage of men is 64.7%. In addition, the salary gap between male and female faculty continues to exist. According to Lennon et al. (2012), women earn close to 20% less than their male counterparts at four-year institutions. While women are obtaining positions within higher education at a similar rate as males, they are not achieving tenure at the same rate (Ortega-Liston & Soto, 2014). “What discrimination exists in postsecondary education is likely to be expressed subtly and indirectly” (Menges & Exum, 1983, p.139). “[W]omen's stronger intentions to leave [their academic job] were influenced by how they perceived female faculty were treated and by their smaller share of workplace rewards” (Dryfhout & Estes, 2010, p. 122). Within higher education, it has been shown that men have historically been more successful than women in terms of salary, promotion, and prestige of the particular institution employing them (Manchester, Leslie, & Kramer, 2010). Furthermore, an examination of research productivity in the Journal of Agricultural Education, revealed no females as productive faculty (Harder, Goff, & Roberts, 2008) during the time period of 1996-2005.

A variety of factors have been identified in the literature as impacting the advancement of women in postsecondary education. Airini et al. (2011) found five themes to describe factors that
help or hinder the advancement of women in university settings: “work relationships, university environment, invisible rules, proactivity, and personal circumstance” (p. 59). Other influences identified as leading to success for women seeking leadership roles in academia include strong family upbringing (Astin & Leland, 1991; Cubillo & Brown, 2003; Hennig & Jardim, 1977; Madsen, 2007), excellent mentoring (Madsen, 2007), and spousal support (Woo, 1985). Environmental aspects were also addressed in the literature. In a study conducted by McCoy, Newell, and Gardner (2013), “women reported significantly lower well-being and a more negative perception of all environmental conditions than men” (p. 309). “Work-life integration” (McCoy, et al., 2013, p.320) was identified as being a significant variable. In the specific discipline of agriculture, six women deans in colleges of agriculture were interviewed to describe their personal journeys to becoming deans of agriculture (Kleihauer, Stephens, & Hart, 2012). This study found that women who became deans had the following in common: (a) first born children, (b) influenced by qualities of their parents and had spousal support, and (c) had mentors who recognized their gifts and talents and encouraged them to seek out leadership positions (Kleihauer et al., 2012). In a study to understand faculty intent to lead within a land grant system, Lamm, Lamm, and Strickland (2013) reported that control over time to develop leadership skills “was the only significant predictor of intent” (p. 92).

Theoretical Framework

The Theory of Work Adjustment (Bretz & Judge, 1994; Dawis & Lofquist, 1984) guided this study by providing a framework for examining factors which lead to the success of women faculty in departments of agricultural education in university settings. Dawis and Lofquist (1984) assert that “work is central to human development and total life adjustment and that work provides a situation for satisfying needs” (p. 7). The Theory of Work Adjustment takes into account the continual interaction between individuals and their work environment while recognizing both the characteristics of the individual and the characteristics of the work environment. At the individual level, an individual retains or acquires abilities and values that become their “personality structure” (p. 24) and also allows for the development of a “unique personality style” (p. 24). The abilities, values and styles with relevance to work have been defined as “work personality” (p.24). This theory is based on the concept of “the interaction between the work personality and the work environment” (Rounds, Dawis, & Lofquist, 1987, p. 298). Each is depicted as impacting the other and level of satisfaction is a result of this interaction.

The Theory of Work Adjustment suggests a relationship between person-environment fit, job satisfaction, and tenure (Bretz & Judge, 1994; Dawis & Lofquist, 1984) and posits that “job satisfaction represents the individual worker’s subjective evaluation of the degree to which his or her requirements are met by the work environment” (Bretz & Judge, 1994, p. 32). Job tenure is the most basic indicator of job satisfaction because it represents the state in which both the individual and the work environment find each other to be acceptable and thus fit. The factor of person-environment fit describes the attribute that those who fit the organization are more than likely attracted to the organization, are favorably evaluated by the organizational members, and display greater work motivation and perform better than those who do not have a good fit (Bretz & Judge, 1994). Person-environment fit also suggests that those who fit the organizational environment will be more successful over time than those who are not a good fit (Bretz & Judge, 1994). Consequently, the reinforcements of fit can even constrain the behavior of individuals to match those of what the organization desires. Thus, those who fit are more likely to stay longer, experience greater job satisfaction, and end up with more career success (Bretz & Judge, 1994).

Reinforcements implemented by organizations to influence employee behaviors to mirror the norms of the organization will ultimately impact individual behavior and those individuals who conform will most likely remain in the organization and be satisfied (Bretz & Judge, 1994). Further,
“it appears that salary and job level may be indirectly affected by person-organization fit” (Bretz & Judge, 1994, p. 48). Given that fit was documented as impacting both satisfaction and success at the individual level, concern regarding one’s fit with an organization is warranted (Bretz & Judge, 1994).

This study did not test the Theory of Work Adjustment; rather, it sought to contextualize this theory for women faculty in agricultural education by providing insight into factors that would enhance their ability to “fit” within their organization or department, be successful in achieving tenure and promotion, and lead to greater career success such as acquiring leadership positions within their institutions. Examination of the strategies of successful women agricultural education faculty in the context of the Theory of Work Adjustment allowed assessment of those factors which enabled these individuals to achieve fit within their institution and discipline and thus enabled greater job satisfaction and secure tenure at their job. These strategies ultimately facilitated an increase in success and positioned these individuals for leadership roles at their respective colleges and universities. Dawis and Lofquist (1984) reported that study of work is best conducted in the natural environment in which it is conducted. Thus, this study specifically focused on work within higher education by women faculty employed in the broad field of agricultural education.

Need for the Study

The need for this study evolved out of the literature and the necessity to increase the number of women in academia who are positioned for leadership roles in colleges and universities. Specifically, the need existed to understand what impacts the success of women in academic leadership positions in nontraditional career fields such as agricultural education in postsecondary education. Nontraditional occupations refer to those which are male-dominated (United States Department of Labor, 2016). To address this need, there must be an identification and examination of factors related to retention, tenure achievement, and general job success. This understanding will encourage capable and qualified women to be successful within their work environment and enable them to fill important leadership roles in postsecondary institutions for the discipline.

Purpose

The purpose of this study was to document success strategies of women agricultural education faculty in postsecondary education, synthesize these strategies into meaningful and useful suggestions, and review these strategies using the framework of the Theory of Work Adjustment (Bretz & Judge, 1994; Dawis & Lofquist, 1984).

Methods

Qualitative methods were utilized to accomplish the purpose of the study due to the nature of the study. Yin (2016) articulates five distinguishing characteristics of qualitative research: 1) focus on real-world people and lives, 2) representation of the views of real people, 3) real-world context, 4) insight to explain behavior and thinking, and 5) involvement of multiple sources of data. Each of these characteristics was represented in this study.

Description of the Women Faculty Who Shared Strategies

Individuals selected to participate in this research were women faculty members in agricultural education at the postsecondary level who were successful in gaining tenure and recognition within a university setting and who had served in leadership positions.

A total of six women faculty, each employed by a different institution, provided input into the findings via the presentation each provided related to strategies for success within postsecondary education. Five institutions were represented in regard to where they obtained their
doctoral degree; only two of the participants had received their doctoral degree from the same institution. The women, as a group, possessed significant academic experience ranging from 16 years to 30 years in the profession, with a combined total of 141 years of academic experience. All held the title of professor and most had served in leadership roles at their respective institutions at the department, college and/or university level. Additional roles served by these individuals included journal editor, Fulbright scholar, and textbook author. Each had also received teaching and research awards in the profession and had been successful in obtaining competitive grants. The participants were selected based upon their past accomplishments and the recognition they had received as being successful in the broad field of agricultural education.

Study Design

The design for this study was a qualitative content analysis. Through content analysis, researchers are able to study indirect human behavior through analysis of communications (Fraenkel, Wallen, & Huyn, 2012). This study examined the presentations of six women faculty in agricultural education who shared success strategies for women in tenure-track positions in postsecondary agricultural education. These women were selected to participate in the presentation series because they met the following criteria: (a) rank of full professor, and (b) involved in academia (either in agricultural education or had advanced to a higher leadership position within their department, college or university). The presentations occurred over the course of one academic year and were shared with participants at one academic institution through a speaker series which involved a lunch and Skype™ format for the presentation. Each of the individuals presented a one-hour session covering best practices and top ten things to remember in regard to success for tenure-track women within agricultural education in higher education. The title of each presentation varied; however, the overall goal for each presentation was to provide recommendations and guidance for success in higher education. Each set of presentation materials was summarized into a one-page handout for each session. The participants agreed to have their presentations recorded. Institutional Review Board approval was received to conduct research using data collected and to follow-up with presenters.

Data analyzed as a part of the study included PowerPoint slides, presentation handouts, notes taken during the live session, and notes taken during a detailed review of the recorded presentations. Each set of top ten recommendations along with individual notes were coded with the letters A-F (a random letter representing each of the six presenters) to maintain confidentiality. Data analysis followed the ethnographic content analysis (ECA) approach (Bryman, 2012). “ECA follows a recursive and reflexive movement between concept development-sampling-data, collection-data, coding-data, and analysis-interpretation” (Bryman, 2012, p. 559). The data were unitized, compared, and integrated into units to investigate emergent themes, categorized, and reported as areas and constructs. Researcher reflexivity and transparency were addressed through the involvement of multiple researchers and the analysis focused on staying true to the participants’ observations and contributions. Data analysis involving a seven step process allowed confirmation of meaning and ensured that all concepts presented were included and accurately represented.

Step one involved each presentation handout being coded with a letter (i.e., A, B, C, D, E, F) to represent the presenter. Notes taken during the live session were also coded with the appropriate presenter code. Items from the handouts and notes were then sorted into categories. This initial analysis resulted in a one-page summary including nine primary categories which included: honesty, time, networking, being in the right place, training/learning, offering help, asking for help, personal life, and professional behavior.

The second step involved two researchers who had not attended the live sessions watching each of the recorded sessions and recording detailed notes. The six presentations were reviewed over a six-week time period. The two researchers compared notes following the viewing of each
presentation. Categories emerged as statements were grouped according to their representative areas based on topic/area mentioned. Combined research notes from the two researchers resulted in a one-page summary for each presenter and were coded with the same codes as the initial data analysis to ensure that all comments could be associated with the correct presenter.

Categories that resulted from step one and step two were compared during step three. This comparison revealed items to be combined or separated. The original nine categories transformed into 23 categories. Each of the 23 categories was supported by coded statements from the presenters.

Step four involved a peer debriefing that was held by a team of three researchers (i.e., the researcher who had coded the live sessions and handouts, and the two researchers who had coded the recorded sessions) to review the resulting summary (Peer Debriefing Document Number One) to “search for patterns” (Yin, 2016, p. 202) allowing concepts and themes to emerge. These concepts and themes were organized into an initial framework which consisted of three prominent areas that emerged from the data and represented actions within the participants’ control: (a) Workplace Awareness and Expectations, (b) Proactive Strategies to Facilitate Success, and (c) Internal Actions. In addition, there were three topics identified that did not fit directly within these areas: “Change is Inevitable,” “Reflect and Prepare,” and “Time Management.” This initial framework was documented in the form of a diagram with supporting codes to allow an audit trail connecting the areas with presenter codes.

The resulting initial framework was re-visited in light of the literature and additional modifications were made in the arrangement of areas and constructs for step five. The three researchers worked together to verify understanding and accurately categorize all statements. The concepts (which had been typed and categorized) were physically cut apart and rearranged on a large table to enable free movement of all concepts. Once arranged by order and category, these items were taped to a large sheet of paper. The framework was analyzed for consistency and care was taken to ensure that concepts were not duplicated and that all items listed were supported by comments/statements of the presenters. Each concept was noted with the codes of the presenter associated with that item. This analysis resulted in Peer Debriefing Document Number Two.

During step six, a debriefing session was held with a fourth researcher who had not been involved in the initial data analysis but who had attended the live sessions. This review allowed confirmation of categories. Based upon feedback received during this session, minor adjustments were made to increase accuracy and understanding of the resulting framework. A summary table of major findings along with a one-page explanation of the table resulted from this analysis.

The final step, step seven, involved the summary table and one-page explanation of the table being submitted for review to the six presenters to check for accuracy. Feedback was received from three presenters within two weeks and minor edits and additions were incorporated into the table. The updated table was sent out to the remaining three presenters for review and two presenters responded with minor edits which were incorporated.

The trustworthiness of this study was established through Lincoln and Guba’s (1985) concepts of credibility, transferability, dependability, and confirmability. Credibility was established through the peer debriefing sessions and follow-up with presenters (Lincoln & Guba, 1985); transferability was established through the use of purposive sampling and participant quotes throughout the findings of the study (Erlandson, Harris, Skipper, & Allen, 1993); and dependability and confirmability were established through the use of audit trails, peer audits, and researcher-kept reflexive journals (Lincoln & Guba, 1985). Participants were provided the summary which emerged from data analysis to allow each presenter the opportunity to provide feedback to the researchers to ensure the information correctly reflected their intentions.
The researchers were the primary instruments for collecting data in this study, which is a characteristic of qualitative research (Merriam, 2009). The notes taken during the live presentations, the analysis of the recorded presentations, and the dissection of the topics and concepts presented were all completed by researchers, who by nature hold unique perspectives. To control for bias, the data was coded and analyzed by two researchers who were not tenure-track faculty and who did not attend the live presentations. This data and the resulting analysis underwent scrutiny by two additional researchers and were provided to the original presenters for review as a form of member check. These steps increased the likelihood that the data accurately reflected the participants’ intentions. However, Peshkin (1988) noted that researchers’ subjectivities can be the underlying factor for distinctiveness of the research and “one that results from the unique configuration of their personal qualities joined to the data they have collected” (p. 18). Thus, the researchers recognized the importance of being aware of subjectivity and used this awareness to avoid bias and also add to the richness of the data analysis.

Results

Success Factors

The results were presented in the form of a summary table in an effort to allow items to be clear and easy to interpret. Table 1 provides the synthesized summary of success factors shared by participants.

Description of Areas

There were three cross-cutting areas that emerged: change is inevitable (A, F), reflect and prepare (A, B, F), and time management (B, C, D, E). Each of these items was mentioned multiple times in the context of impacting overall success. As noted by participants, “prepare yourself for change” (F), “reflect on where you are now and where you want to be” (D), and “organize your time by hours and days” (E).

The remaining items were grouped into four primary areas (represented by columns): (a) workplace awareness and expectations, (b) proactive strategies to facilitate success, (c) internal actions, and (d) external actions. A close examination of the items in each of the four areas revealed overlapping concepts or similarities across the columns. We found that there were four words that could describe the context of these categories (represented by rows): foundation, individual, cooperation, and balance. Foundation relates to the context of the basic building blocks in an environment. Individual relates to the context of specific items relevant to you; these items could be different for each person and relates to individual choice. Cooperation applies to the context specifically related to those actions that deal with interaction among individuals. Balance encompasses aspects that impact quality of life and productivity at the individual level.

Workplace Awareness and Expectations

Workplace awareness and expectations relate to the position and institution where one is employed. Awareness and acceptance of aspects that come with the position was expressed by participants as critical. It was noted that some situations already exist and some will evolve. Concepts included office politics, workplace culture, understanding expectations, gathering feedback, collegiality, and avoiding over commitment. As noted by participants, “don’t get involved in office politics” (C) and “know department and university/college culture” (B). Further, the importance of knowing expectations (B, C, D) and gathering feedback (A, B, C, D) was stressed. As one participant stated, “Get 360-degree feedback early and often” (C). The significance to “seek balance in your job” (B) and avoid being over committed (B, C, D) was expressed as important for allowing you to have “time for creativity” (C).
Table 1

*A Synthesized Summary of Success Factors for Tenure-Track Women Faculty in Agricultural Education in Higher Education based upon Six Presentations by Successful Women Faculty*

<table>
<thead>
<tr>
<th>Areas:</th>
<th>Workplace Awareness and Expectations</th>
<th>Proactive Strategies to Facilitate Success</th>
<th>Internal Actions</th>
<th>External Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foundation</strong></td>
<td>Avoid office politics (C,D)</td>
<td>Be an expert (C)</td>
<td>Maintain integrity (A,B,D)</td>
<td>Communicate effectively while recognizing office dynamics (A,B,C,F)</td>
</tr>
<tr>
<td></td>
<td>Know workplace culture (B,C,F)</td>
<td>Network and build relationships (A,B,D,E,F)</td>
<td>Be a good citizen (B,D,F)</td>
<td></td>
</tr>
<tr>
<td><strong>Individual</strong></td>
<td>Understand expectations (B,C,D,E)</td>
<td>Seek and apply for grants (A,B,C,D,E,F)</td>
<td>Know yourself and improve (A,B,D,F)</td>
<td>Present yourself in a professional manner (A,C)</td>
</tr>
<tr>
<td></td>
<td>Gather feedback (A,B,C,D)</td>
<td>Use grants to generate journal articles (C)</td>
<td>Join professional associations to continue learning (A,B,C,D,E,F)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Find a mentor and be a mentor (B,C,D,F)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Take initiative for recognition (B,C,D,F)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Serve on committees (A,C,F)</td>
<td></td>
</tr>
<tr>
<td><strong>Cooperation</strong></td>
<td>Maintain collegiality (B)</td>
<td>Collaborate with others (A,B,C,D,E,F)</td>
<td>Know what you can contribute (B,D,F)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know your external constituents (B2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Offer and receive help (A,B,C,D,E,F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Balance</strong></td>
<td>Avoid over commitment (B,C,D)</td>
<td>Commit to the appropriate activities (B2)</td>
<td>Maintain personal time (A,B,C,D,F)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Columns represent “Primary Areas Identified”; Rows represent “Context”; Letters (A,B,C,D,E,F) represent participant codes.
Proactive Strategies to Facilitate Success

Proactive strategies to facilitate success focused on areas related to becoming an expert, building a network, taking initiative, and collaborating with others. Each of these items related to interaction with individuals. In order to succeed and thrive, you cannot do this by yourself – you need to be proactive in building relationships and your individual decision of engagement will impact your success. Communication and cooperation with others in your unit, department, college, university, and field was expressed as critical. Participants provided guidance that included to “become a content expert and know your science” (C), “engage with colleagues in the professional community” (F), “create a good reputation” (B), and “introduce yourself to people” (A). “Work relationships” (A, B, D, E) were indicated as a critical component of success.

Items specifically related to activities at the individual level included the application for grants, participation in professional associations, identifying a mentor, taking initiative for recognition, and serving on committees. All participants indicated the importance of applying for grants. However, specific advice included “use a team approach to obtain grant funding” (A), “serve on grant review panels” (D), and “apply for big and small grants” (F). As one participant stated, “grant seeking will naturally lead to more journal articles” (C). Involvement in professional associations was encouraged by all participants. Specific advice included, “use associations to stay updated on your field” (F), “attend professional development seminars to improve skills” (D), and use associations to “continue to learn” (A). An encouragement to engage in a mentorship process was not limited to “find[ing] a mentor” (F, D) but also extended to serving as a mentor (C, F). As one participant stated, you will be able to “learn from others’ experiences” (B). The importance of taking initiative for recognition was articulated by participants as a critical step. “Do not be humble about achievements” (D), “apply for awards” (B) and “keep good records” (D). Finally, “serv[ing] on committees” (A, C, F) was articulated as an important aspect of success because it allows others to know you.

Collaboration with others was noted by all participants as a critical aspect of facilitating success. It was noted that collaboration should take place “across different colleges, universities, and departments” (C). “Being a team player” (B), “clear communication” (A), and “get[ting] different perspectives and opinions from others” (B) can encourage success. Offering and receiving help was also noted as important by all participants. It was noted that it was critical to “get different perspectives and opinions from others” (B), “accept compliments” (A), and “offer help to others” (F).

Internal Actions

Internal actions relate to self-awareness and being true to yourself. Participants expressed that you need to uphold elements of good character. Success was also expressed as encompassing the individual person being successful in their personal life. These aspects were recognized as ones that may be more difficult to change or control due to their very personal nature. Multiple participants indicated the importance of maintaining integrity (A, B, D). “Don’t undermine your credibility” (A) and “do what you say you will” (B). The importance of “be[ing] a good citizen” (B, D) was also expressed as important. The areas of internal actions also related to knowing yourself and improving. “Know your strengths and weaknesses” (B, C) and identify what you can improve upon (A, F). “Passion” (B, C) was a word used by participants to articulate the need for individuals to match their interests with their research, teaching, and service. “Passion helps you stay motivated” (C). You need to “find the right fit” (F) and “play to your strengths” (C). Caution was shared in regard to focus on teaching (B, E). “Don’t focus all of your energy on teaching, learn to be a scholar” (E). Participants also encouraged individuals to “do what you like and like what you do” (F). Enjoyment and fun was expressed as components that reflect true success. Finally,
the concepts of knowing what you can contribute (B, D) and how to maintain work-life balance were also expressed as internal actions. You need to “make a valuable contribution to your university” (B) but “work doesn’t define you, you define work” (A). The importance of maintaining personal time was articulated by multiple participants (A, B, C, D, F). As one participant stated, “we are doing a disservice to society by not having time to be creative” (C).

External Actions

External actions relate to how you handle yourself (i.e., dress, voice, manners, and behaviors). You can change or alter these aspects. Participants expressed the importance of clear communication. As one participant stated, “do not ruminate around men with power” (C). Effective communication requires that we “avoid negativity” (F), “be approachable” (A), “spread optimism” (F), and “develop credibility” (B). This can be further enhanced through presenting ourselves in a professional manner. “Be mindful of dress” (C), “speak in an authoritative tone” (C), and “look the part in presence, dress, and speech” (A).

Review of Results Using the Theory of Work Adjustment (TWA)

The Theory of Work Adjustment (TWA) (Bretz & Judge, 1994; Dawis & Lofquist, 1984) provides a lens through which to look at the summarized results collected in the study. TWA suggests potential for interaction among person-environment fit, job satisfaction, and tenure. Given that study participants were purposefully selected due to their success within academia, tenure within the job environment is a given. Each of the participants had multiple years of employment at their respective institutions. Thus, the strategies documented in Table 1 are based on that success. The TWA factor of “person-environment fit” can be seen specifically in items listed under the category of “Workplace Awareness and Expectations” as well as across the contexts of “Foundation,” “Individual,” and “Cooperation,” while the factor of “job satisfaction” can be seen under the category of “Internal Actions” and across the context of “Balance.”

As noted by Dawis and Lofquist (1984), TWA reflects a continual interaction between an individual and their work environment. Thus, as one reflects on the items listed in Table 1, it becomes apparent that these items are not merely a list of “to-do” items but rather a list of recommended actions that a person should continually do in order to have a higher likelihood of success within postsecondary education. These items represent abilities, values and styles that makeup the “work personality” (Dawis & Lofquist, 1984, p.24) of higher education from the perspective of the participants and reflect the participants’ perspective of what actions they perceived allowed them to be successful within the work environment of higher education.

Conclusions

The findings of this qualitative study are not generalizable, but results can be transferrable and have utility in that manner. Based on results, it was concluded that women faculty in this study proactively controlled their career success in higher education through actions outlined or reactively responded to situations outside of their control. These findings are consistent with research studies related to what women must do to achieve advancement within their careers (Kleihauer et al., 2012; Melamed, 1996). The themes identified by Airini et al. (2011) which included work relationships, university environment, invisible rules, proactivity, and personal circumstance regarding the advancement of women are supported by this study. Findings articulate the importance of building strong work relationships and understanding workplace culture. The concept of proactivity is strongly supported through specific comments made by participants in regard to taking initiative and serving in specific roles such as serving on committees. Just as Madsen (2007) noted the importance of mentoring, participants from this study also emphasized the value that mentoring plays in the success of women faculty.
Given that the TWA elements can be seen within the summary of success concepts documented, we concluded that acting on the items noted in Table 1 has the potential to impact the outcome of interaction within one’s work environment in a positive manner. The suggestion of a relationship between person-environment fit, job satisfaction, and tenure as noted by the TWA (Bretz & Judge, 1994) was supported by these findings. Participants specifically noted the need for individuals to find their fit within the organization. The concept of job satisfaction was also noted through the concepts of enjoyment and passion. In fact, given that study participants had achieved success in their field and also displayed high job satisfaction, we concluded that the strategies they provided could assist female faculty in achieving not only success but also job satisfaction.

Spousal support (Woo, 1985) and family upbringing (Astin & Leland, 1991; Cubillo & Brown, 2003; Hennig & Jardim, 1977; Madsen, 2007) were not mentioned by the participants in this study. It is possible that the absence of these items relate to the focus of the study which was to document success strategies. Given that both spousal support and family upbringing are not items that one would have control over, it is possible that participants did not see these items as relevant.

**Discussion and Recommendations for Practice**

Given the female enrollment in both secondary (Lawrence et al., 2013) and postsecondary (Texas A&M University, 2014) agricultural education, it is critical that women faculty in higher education emerge as role models for these students. The documented success strategies revealed realistic and practical advice that could benefit the profession of agricultural education by recruiting and retaining faculty who can provide excellence and consistency in building a scientific and professional workforce (Doerfert, 2011).

The identification of the areas of “change is inevitable,” “reflect and prepare,” and “time management” offer clear advice and guidance. It is recommended that these strategies be carefully considered especially by those early in their career. Multiple participants articulated these items as critical and analysis revealed that these three items cut across all categories.

The four primary areas that were represented by columns in Table 1 provide individuals guidance as to how to approach the strategies. The strategies that fall within “workplace awareness and expectations” relate to the specific context of the higher education workplace. Each institution has a unique context and it is critical to understand the dynamics that exist within that context. The area labeled “proactive strategies to facilitate success” reflects actions that can be taken by an individual to encourage positive relationships within the higher education context that can lead to success. The two areas that include “internal actions” and “external actions” are focused on actions that are independent of context and do not necessarily relate to interaction with others but rather how you handle yourself.

Categorization of the success factors across the areas of “foundation,” “individual,” “cooperation,” and “balance,” allows one to see how each strategy can actually compliment and contradict one another. For example, in the category of “balance,” there is a recommendation to “avoid over commitment” but “commit to the appropriate activities.” Thus, while participants encourage one to “maintain personal time,” they are not advocating a lack of commitment. In other words, the strategies are not a list of “to-dos” but rather “guidelines for success” for women faculty according to where they are positioned within their organization and where they are in regard to their career.

There were four specific items noted by all participants: 1) seek and apply for grants, 2) join professional associations, 3) collaborate with others, and 4) offer and receive help. Given that these items were noted independently by all six successful women faculty, we highly encourage
individuals to carefully consider the importance of these items. Further, a majority of the items overall fell within the category of “Proactive Strategies to Facilitate Success,” thus, we encourage individuals to take the word “proactive” seriously and take steps to secure success within the higher education workplace by acting on the items listed.

While this study was focused on women tenure-track faculty in agricultural education, it is believed that the strategies identified are appropriate for all tenure-track faculty in postsecondary education as they are adaptable and articulate clear advice for advancing in one’s career. It is recommended that this information be shared broadly with faculty in agricultural education in order to provide guidance for future generations. This qualitative study adds to the body of research related to the advancement of faculty in postsecondary education.

**Recommendations for Research**

The topic of success in academic settings would benefit from additional study. The study we reported here focused purposefully on the female perspective. Successful women faculty in agricultural education shared their strategies for success and these strategies were synthesized into a concise summary. We recommend additional research that involves a male perspective of success in postsecondary education. It would be useful to have successful male faculty review the findings from this study and provide input as to additional strategies or modifications to the strategies listed. Input from diverse perspectives could add to the overall description of success factors.

It would also be beneficial to interview or conduct focus groups with successful faculty to determine additional strategies that may not have been identified in this study. Of particular use would be case studies that document successful implementation of the strategies in order to provide a clear picture of implementation. Knowing a strategy is much different than implementing one. It is also possible that success strategies could vary across phases of a career path. Further research to clearly identify success strategies based on these phases (e.g., pre-tenure, post-tenure) would be helpful.

**References**


Expectation Congruency and Psychosocial Support in Formal Agriculture Teacher Mentoring Relationships

John Tummons1, Tracy Kitchel2, and Bryan L. Garton3

Abstract

Educational leaders have widely implemented mentoring and induction programs to support beginning teachers as they enter the profession. A variety of contextual factors within the mentoring dyad and program may impact the mentoring relationship and subsequent support received by the beginning teacher. The purpose of this study was to describe the relationship among mentoring Expectation Congruency, Interaction, and Psychosocial Support received by agriculture teachers participating in Beginning Teacher Mentor/Induction program. Researchers collected mentoring relationship data from 83 first and second year agriculture teachers participating in a state-mandated mentoring and induction program, with a 95.35% response rate. We used a hierarchical multivariate linear regression to determine the proportion of unique variance in Psychosocial Support attributable to differences in Expectation Congruency, Interaction time, and covariates identified through a review of literature. Researchers concluded differences in Expectation Congruency and Perceived Similarity each explained a large ($d > 1.0$) proportion of variance in Support received by beginning teachers in the Acceptance, Counseling, Friendship, and Role Model functions. Variation in interaction time did not explain significant proportions of variance in support received for any psychosocial support constructs.

Keywords: Mentor; Mentoring; Psychosocial Support; Interaction; Expectation Congruency; Induction; Professional Development

Introduction/Review of Literature

Teaching is a difficult and complicated task. Although beginning teachers have many years of classroom experience as a learner, student experiences may provide limited support in novice teachers’ transition into their role as teacher (Darling-Hammond & Bransford, 2005). Beginning agriculture teachers face issues of isolation and often feel overwhelmed and underprepared to handle their assigned duties (Greiman, Walker, & Birkenholz, 2005; Mundt & Connors, 1999). Beginning agriculture teachers must also fulfill additional roles beyond the classroom instructor, including the management of laboratories, student leadership organizations, and cooperative work programs (Joerger, 2003; Torres, Lawver, & Lambert, 2009). Two-thirds of beginning agriculture teachers in Missouri work in excess of 56 hours/week; these teachers felt tensions about how they actually spend their time as compared to how they would like to spend their time (Lambert, Ball, & Tummons, 2011; Torres, Lambert, & Tummons, 2012). Further, Missouri agriculture teachers reported stress levels higher than normative manager data from excessive paperwork, working overtime, meeting deadlines, frequent interruptions, insufficient personal time, and critical on the spot decisions (Torres et al., 2009). Beginning teachers who cannot cope with the demands of their

1 John D. Tummons is an Assistant Teaching Professor of Agricultural Education in the Department of Agricultural Education & Leadership at the University of Missouri, 123 Gentry Hall, Columbia, MO 65211, tummonsj@missouri.edu
2 Tracy Kitchel is Professor and Chair of the Department of Agricultural Communication, Education, and Leadership, The Ohio State University, 208 Agricultural Administration, 2120 Fyffe Road, Columbus, Ohio 43210, kitchel.2@osu.edu
3 Bryan L. Garton is a Professor of Agricultural Education and Associate Dean of Academic Programs for the College of Agriculture, Food and Natural Resources at the University of Missouri, 2-64 Agriculture Building, Columbia, MO 65211, gartonb@missouri.edu
job viewed themselves as ineffective and were overwhelmed with the responsibilities placed upon them (Bennett, Iverson, Rohs, Langone, & Edwards, 2002; Johnson & Birkeland, 2003). Ten percent of beginning teachers in 2007-2008 did not teach past the first year; over one-half of beginning teachers left the profession after year five (Kaiser, 2011; NCTAF, 2003). These findings underscore the concerns the agricultural education profession should have in regard to attrition.

In response to these concerns, educational leaders have widely implemented induction/mentoring programs to support beginning teachers as they transition into the classroom. Smith and Ingersoll (2004) reported 83% of public school teachers received some form of induction assistance in their transition from student to professional educator; ninety-three percent of beginning agriculture teachers in Missouri reported having a formal mentor (Greiman et al., 2005). Although most beginning teachers receive support, there is much variation in how induction programs are administered, including differences in duration, components, scope, populations, intensity, and support/sponsorship (Ingersoll & Strong, 2011; Nasser-Abu Alhija & Fresko, 2010; Wayne, Youngs, & Fleischman, 2005; Wong, 2005). Seventy-two percent of AAAE-affiliated teacher preparation programs assist with beginning teacher induction programs; more than one-half of these institutions conduct workshops (72.7%), on site-visits (58.2%), and offer specific coursework (56.4%) for new agriculture teachers (Franklin & Miolina, 2012). In a meta-analysis of teacher mentoring programs, Hobson, Ashby, Malderez, and Tomlinson (2009) proposed contextual factors such as program design, mentor selection and pairing, mentor preparation and support, and the school culture played could influence the perceived purposes of induction and subsequent behaviors and strategies implemented to achieve these goals.

Nearly all induction programs included a formal mentoring component (Ingersoll & Smith, 2004; Wong, 2004), and mentoring is often the most prominent characteristic of induction programs (Fideler & Haselkorn, 1999; Horn, Sterling, & Subhan, 2002). The mentor is often the face of the induction program and is responsible to deliver the school’s induction policy to the beginning teacher (Carver & Feiman-Nemser, 2009). Although the most common goal of teacher mentoring is to retain teachers in the profession, other purposes can include teacher assessment, or, perhaps weeding out, teachers who are not suited to the job (Ingersoll & Kralik, 2004; Ingersoll & Smith, 2004). Beginning Oklahoma agriculture teachers participating in a state-mandated induction program reported their mentor teacher provided the greatest amount of support; however, some beginning teachers viewed the purpose of the induction program to be evaluative, rather than supportive (Peiter, Terry, & Cartmell, 2005).

**Theoretical Framework**

Fletcher and Ragins (2007) suggested mentoring is best understood by examining the micro-level, growth-fostering interactions, or episodes, between mentor and protégé. The perceived quality of the mentoring relationship is based on the quality of the individual mentoring exchanges, or episodes, within the relationship. After a mentoring episode, both mentors and protégés evaluate the exchange against the predetermined role expectations held by both parties for the other person in the relationship (see Figure 1). Individual episodes which support initial relationship expectations lead to positive evaluations of mentoring episodes, whereas exchanges which do not meet expectations will decrease perceived relationship quality (Murphy & Freiheit, 2013; Ogilvie & Ashmore, 1991; Ragins & Verbos, 2007). A work relationship becomes a meaningful mentoring relationship when the number of positive episodes reaches a “tipping point” of development (Fletcher & Ragins, 2007).
An individual’s expectations for mentoring are driven by his or her mentoring schema. Mentors and protégés may differ in expectations of support needed and subsequent role behaviors (Smith, Howard, & Harrington, 2005; Young & Perrewe, 2000). Further, beginning teachers may enter formal mentoring programs with inflated or unrealistic expectations for mentor and program support; unmet expectations are a common issue among beginning teachers participating in teacher mentor programs (Blake-Beard, 2001; Eby & Lockwood, 2005). Conversely, mentors and protégés who share similar, or congruent, expectations for mentoring relationships described increased relational self-value and relationship quality; mentoring expectation congruency was significantly and positively related to feelings of interpersonal comfort and perceived similarity in a population of formal and informal mentors (Murphy & Freiheit, 2013). Young and Perrewé (2004) reported a significant relationship between protégés’ general expectations for career and psychosocial mentor support and reports of the corresponding support received.

The structure of formal mentoring programs may restrict the formation of high-quality mentoring connections between mentor and protégé (Baugh & Fagenson-Eland, 2007). Early meetings between formal mentor and protégé are often marked with feelings of awkwardness, anxiety, tentativeness, and feelings of skepticism for both mentors and protégés and have been referred to as similar to “blind dates” (Blake-Beard, O’Neill, & McGowan, 2007). Unsatisfied with their formal mentors, young teachers may seek informal mentoring relationships within their school to provide complementary support not received from their formal mentors (Desimone et al., 2014). In response to these concerns, mentor program administrators have enacted policies to imitate the relationship development found in naturally-occurring informal mentoring relationships (Ragins, Cotton, & Miller, 2000). Although it is clear good mentoring is important to support beginning teachers, what is less conceptually clear is what “good” mentoring looks like (Feiman-Nemser, Schwille, Carver, & Yusko, 1999). The broad implementation of mentoring programs has created confusion about the definition of mentoring and expectations for what mentors can provide a beginning teacher (Mertz, 2004). Mentoring is complex; each mentoring relationship is a unique partnership between mentor and protégé (Fletcher & Ragins, 2007). Despite the intentions of formal mentor program administrators, the assignment of a mentor to a beginning teacher does not necessarily guarantee mentoring will occur (Wang & Fulton, 2012).

Mentoring relationships vary along a continuum of quality; the ability for a mentor to provide support functions is contingent on the quality of the mentor/protégé relationship (Ragins
et al., 2000). A recent study (Murphy & Freiheit, 2013) suggests congruent mentoring expectations can significantly predict relationship quality for formal and informal mentoring relationships. A gap in the literature exists in what role congruent expectations and mentoring interactions play in formal beginning teacher mentoring programs, specifically regarding the psychosocial support received by beginning teachers.

**Purpose/Research**

**Questions/Hypotheses**

The purpose of this study was to explain the relationship among mentoring Expectation Congruency, Scope of Interaction, and Psychosocial Support received by beginning agriculture teachers participating in a state-supported formal mentoring program. This inquiry aligns with the AAAS National Research Agenda priority six in describing “what are the appropriate models for engaging volunteers in the delivery of educational programs in agricultural and natural resources” (Graham, Arnold, & Jayaratne, p.51). The following serve as specific research questions to reach this purpose:

To what extent did beginning agriculture teachers and their formal mentors share congruent expectations for the relationship?

1. What was the frequency and scope of formal mentoring activities in the formal mentoring relationship as reported by beginning agriculture teachers?
2. To what extent did beginning agriculture teachers receive support in the psychosocial (Acceptance, Counseling, Friendship, Role Modeling, and Social) mentor functions?
3. To what extent did Expectation Congruency and Interaction predict variation in beginning agriculture teacher perceptions of psychosocial support received?

**Methods**

This study employed descriptive and causal-comparative research methods to address questions about the mentoring experiences of beginning secondary agriculture teachers with their formal agriculture mentors. The target population for this study was beginning secondary agriculture teachers participating in the Missouri Agriculture Teacher Induction and Mentoring Program. The accessible population consisted of all Missouri agriculture teachers completing their first year of teaching in 2012-2013 (n =33) or 2013-2014 (n = 53). The author determined the beginning agriculture teachers were a time and place sample of the population (Oliver & Hinkle, 1982); the use of inferential statistics was justified, as the beginning teacher population could be considered representative of future populations of beginning agriculture teachers in Missouri.

The investigator used components of five instruments to measure both the variables of interest and other potential predictors of mentor support, as identified in the review of literature. These instruments were assembled into one questionnaire. Each instrument was assumed to be reliable, as all reliability estimates (α) exceed the minimum .70 threshold suggested by Nunnally (1978). The first instrument used was the Mentoring Expectations Congruency Scale (MECS) developed by Murphy and Freiheit (2013). This instrument sought to examine to what extent beginning teachers perceived their expectations for the mentoring relationship were similar to their
mentor, using a 7-point Likert-type scale, with anchors of 1 = strongly disagree to 7 = strongly agree and a reported reliability estimate of $\alpha = .92$. The second instrument utilized was the Mentor Relationship Questionnaire (MRQ), designed to assess mentor psychosocial support from the perspectives of the beginning teacher (Greiman, 2003). Beginning teachers responded to 15 items using a 7-point Likert-type scale, anchored as 1 = not at all, 3 = some extent, 5 = large extent, and 7 = very large extent. The third instrument utilized was the Turban, Dougherty, and Lee (2002) Perceived Similarity instrument. The purpose of this instrument was to estimate the perceived similarity protégés experienced to their mentor. The five-question instrument had a reported reliability estimate of $\alpha = .87$. The fourth instrument utilized was Allen, Eby, and Lentz’s (2006) Program Understanding instrument. Participants responded to four questions concerning their understanding of the mentoring program using a 5-point Likert-type scale, with a reliability estimate reported at $\alpha = .82$. The fifth instrument was the Seibert, Crant, and Kraimer (1999) Proactive Personality Scale. The ten-question instrument utilized a 7-point Likert-type scale and a reported reliability of $\alpha = .86$. Information was collected regarding frequency and scope of mentor meetings per week, gender composition of their mentoring dyad, and certification type. Same-race dyad, match input, and training differences were also identified in literature as potential covariates; however, no variation among beginning teachers and mentors in these variables was identified so they were excluded from the current study. A panel of experts reviewed the hard copy of the questionnaire and provided the author input on the content and face validity of the paper instrument.

Participant data were collected using procedures outlined in Dillman, Smyth, and Christian’s (2009) Type III mixed-mode survey method. Using a paper and pencil instrument, the author collected 64 usable responses from first-year and second-year agriculture teachers who attended the required statewide meeting in January 2014. Following the statewide meeting, the investigator distributed an identical electronic questionnaire to all non-respondents, guided by Dillman et al. (2009) web survey implementation protocol. An additional 18 usable responses were received, yielding a total response rate of 95.35% ($n = 82$). This response rate exceeded the 85% response rate suggested by Linder, Murphy, and Briers (2001) for non-response concern; therefore, the author conducted no additional procedures for control of non-response error.

All research questions were answered from the perspective of the beginning agriculture teacher. Researchers calculated mean, median, mode, variance, and standard deviation to address research questions one, two, and three. For research question four, the author identified Expectation Congruency and Interaction Scope as the two independent variables of interest and the five psychosocial mentor functions received as the dependent variables. The researcher utilized a hierarchical multivariate regression to explain what unique variance in psychosocial support received could be attributed to differences in Expectation Congruency and Interaction. Based on teacher mentoring research (Hobson et al., 2009) suggesting contextual factors could influence mentoring received, the author identified eight potential predictors of psychosocial support specific to protégé and dyad characteristics from previous research [same-sex dyad (Allen & Eby, 2003), perceived similarity (Burris, Kitchel, Greiman, & Torres, 2006), certification type (Roberts & Dyer, 2004), (Allen et al., 2006), proactivity (Wanberg, Kammeyer-Mueller, & Marchese, 2006), same-race dyad (Ragins, 1997), orientation, program understanding, and match input (Allen et al., 2006)]. Among these predictors, five factors (same-sex dyad, perceived similarity, certification type, program understanding, and proactivity) were identified as covariates or rival explanations and were entered into the first hierarchical regression block. After the researcher accounted for potential covariates, the independent variables were entered simultaneously into a second regression block, since no literature was found supporting the influence of one independent variable over the other (Field, 2009). Researchers tested and found the nine required assumptions for inferring conclusions to a population as tenable (Field, 2009). For research question four, the investigator calculated and reported the unstandardized beta coefficient ($B$) and accompanying standard error, the adjusted coefficient of determination ($R^2$), $t$-value, significance ($p$), and effect size ($d$) for all covariates in
step one (Model 1) and covariates and independent variables in step two (Model 2) of the regression model. The author calculated and reported the $R^2$ change ($\Delta R^2$) and the $F$ statistic for both Model 1 and Model 2, in addition to the $F$ change ($\Delta F$) statistic from adding the independent variables to the regression model.

**Findings**

Research question one sought to determine to what extent beginning agriculture teachers perceived they held congruent expectations for the relationship with their mentor. On a scale from $1 = $ strongly disagree $\rightarrow 7 = $ strongly agree, beginning teachers moderately agreed ($M = 5.72, SD = 1.59, Range 1.00-7.00$) they shared congruent expectations with their mentors about the roles, functions, and outcomes of the mentoring relationship (see Table 1).

Table 1

**Descriptive Summary of Congruency and Psychosocial Measures by Beginning Agriculture Teachers ($n = 82$)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>$M$</th>
<th>$SD$</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congruency</td>
<td>5.72</td>
<td>1.59</td>
<td>1-7</td>
</tr>
<tr>
<td>Number of Interactions</td>
<td>1.65</td>
<td>2.51</td>
<td>0-15</td>
</tr>
<tr>
<td>Hours Per Week Interacted</td>
<td>1.44</td>
<td>1.73</td>
<td>0-10</td>
</tr>
<tr>
<td>Psychosocial Support Construct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friendship</td>
<td>5.55</td>
<td>1.67</td>
<td>1-7</td>
</tr>
<tr>
<td>Acceptance</td>
<td>5.54</td>
<td>1.38</td>
<td>1.33-7</td>
</tr>
<tr>
<td>Counseling</td>
<td>5.48</td>
<td>1.61</td>
<td>1-7</td>
</tr>
<tr>
<td>Role Model</td>
<td>5.21</td>
<td>1.66</td>
<td>1-7</td>
</tr>
<tr>
<td>Social</td>
<td>4.29</td>
<td>1.97</td>
<td>1-7</td>
</tr>
</tbody>
</table>

Note. Scale for psychosocial constructs was $1 = $ not at all, $3 = $ some extent, $5 = $ large extent, $7 = $ very large extent.

Research question two queried the frequency and scope of formal mentoring activities in the formal mentoring relationship as reported by beginning agriculture teachers. Beginning teachers reported they interacted with their formal mentors an average of 1.65 times per week ($SD = 2.51$), with a range of 0-15 developmental interactions each week. Beginning agriculture teachers reported they interacted with their mentor an average of 1.44 hours each week ($SD = 1.73$), with a range of 0-10 hours each week.

Research question three examined to what extent beginning agriculture teachers received support in the psychosocial (Acceptance, Counseling, Friendship, Role Modeling, and Social) mentor functions. Beginning teachers reported they felt supported to a large extent ($M = 5.55, SD = 1.67$) in the Friendship and Acceptance ($M = 5.54, SD = 1.38$) psychosocial functions. Additionally, beginning teachers reported they were supported to a large extent in the Counseling ($M = 5.48, SD = 1.61$) and Role Model ($M = 5.21, SD = 1.66$) functions. Beginning agriculture teachers felt supported to some extent ($M = 4.29, SD = 1.97$) by their assigned mentors in the Social psychosocial mentoring function (See Table 1).

For research question four, researchers tested the null hypothesis, which stated variations in Expectation Congruency and Interaction did not explain a significant ($p > .05$) proportion of
variance in each of the psychosocial support functions received by beginning agriculture teachers. The investigator regressed Social Support against potential covariates in Model 1 (see Table 2). The covariate regression model was significant, $F = 21.61(5, 76, p < .05)$, as the contribution of Same-Sex Dyad, Perceived Similarity, Certification Type, Program Understanding, and Proactivity explained a significant (adjusted $R^2 = .56$) proportion of the variance in Social support received. Among the covariates, only Perceived Similarity had a large (Cohen, 1992) effect size ($d = 1.57$) in explaining variation in Social support. For Model 2, Expectation Congruency and Interaction were added as independent variables into a second regression block. Model 2 was also significant, $F = 15.59 (7, 74, p < .05)$, whereas Expectation Congruency, Interaction, and covariates explained a significant (adjusted $R^2 = .56$) proportion of variance in Social support received. However, the addition of Expectation Congruency and Interaction added only one percent to the predictive capability of the regression, as compared to Model 1 ($\Delta R^2 = .01$). The author identified a non-significant change in $\Delta F = 0.82 (2, 74, p = .45)$ between Model 1 and Model 2; researchers failed to reject the null hypothesis for Social support (See Table 2).

Table 2

<table>
<thead>
<tr>
<th>Hierarchical Regression of Social Mentor Support Received on Interaction and Congruent Expectations (n = 82)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>(Constant)</td>
</tr>
<tr>
<td>Same-Sex dyad $^a$</td>
</tr>
<tr>
<td>Similarity</td>
</tr>
<tr>
<td>Program Understanding</td>
</tr>
<tr>
<td>Certification Type $^b$</td>
</tr>
<tr>
<td>Proactivity</td>
</tr>
<tr>
<td>Congruent Expectations</td>
</tr>
<tr>
<td>Interaction (hours/week)</td>
</tr>
<tr>
<td>$Adjusted R^2$</td>
</tr>
<tr>
<td>$R^2$ Change</td>
</tr>
<tr>
<td>$F$</td>
</tr>
</tbody>
</table>

Note. $^a$ coded as 1 = same sex dyad and 2 = different sex dyad. $^b$ coded as 1 = traditional certification and 2 = certification other than traditional * = $p < .05$

For Counseling Support, the covariate model was significant, $F = 32.67(5, 76, p < .05)$. The variation in Same-Sex Dyad, Perceived Similarity, Certification Type, Program Understanding, and Proactivity explained a significant (adjusted $R^2 = .66$) proportion of variance in Counseling support received by beginning teachers (see Table 3). Perceived Similarity was the only covariate to have a large (Cohen, 1992) effect size ($d = 1.97$) for predicting variation in Counseling function. Regression Model 2, which included the independent variables of interest with the covariates, was also significant, $F = 37.85 (7, 74, p < .05)$, adjusted $R^2 = .76$ for the Counseling function. The addition of the Congruent Expectations and Interaction explained an additional 10% of variance ($\Delta R^2 = .10$) in Counseling support received. The author identified a
significant $\Delta F = 16.82(2,74, p < .001)$ difference between Models 1 and 2; therefore, the researcher rejected the null hypothesis in favor of the alternative hypothesis, which stated Expectation Congruency and Interaction accounted for a significant ($p < .05$) proportion of variance in the Counseling function, when controlling for known covariates.

Table 3

Hierarchical Regression of Counseling Mentor Support Received on Interaction and Congruent Expectations ($n = 82$)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>B 0.98</td>
<td>B 0.96</td>
</tr>
<tr>
<td></td>
<td>SE B 1.12</td>
<td>SE B 0.02</td>
</tr>
<tr>
<td></td>
<td>d 0.20</td>
<td>d 0.02</td>
</tr>
<tr>
<td>Same-Sex dyad</td>
<td>B -0.09</td>
<td>B -0.04</td>
</tr>
<tr>
<td></td>
<td>SE B 0.25</td>
<td>SE B 0.21</td>
</tr>
<tr>
<td></td>
<td>d 0.08</td>
<td>d 0.04</td>
</tr>
<tr>
<td>Similarity</td>
<td>B 0.74*</td>
<td>B 0.44*</td>
</tr>
<tr>
<td></td>
<td>SE B 0.09</td>
<td>SE B 0.09</td>
</tr>
<tr>
<td></td>
<td>d 1.97</td>
<td>d 1.15</td>
</tr>
<tr>
<td>Program Understanding</td>
<td>B 0.45*</td>
<td>B 0.23</td>
</tr>
<tr>
<td></td>
<td>SE B 0.17</td>
<td>SE B 0.15</td>
</tr>
<tr>
<td></td>
<td>d 0.61</td>
<td>d 0.34</td>
</tr>
<tr>
<td>Certification Type</td>
<td>B -0.05</td>
<td>B 0.13</td>
</tr>
<tr>
<td></td>
<td>SE B 0.30</td>
<td>SE B 0.26</td>
</tr>
<tr>
<td></td>
<td>d 0.03</td>
<td>d 0.12</td>
</tr>
<tr>
<td>Proactivity</td>
<td>B -0.18</td>
<td>B -0.10</td>
</tr>
<tr>
<td></td>
<td>SE B 0.15</td>
<td>SE B 0.13</td>
</tr>
<tr>
<td></td>
<td>d 0.28</td>
<td>d 0.18</td>
</tr>
<tr>
<td>Congruent Expectations</td>
<td>-0.50*</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>0.13</td>
<td>1.34</td>
</tr>
<tr>
<td>Interaction (hours/week)</td>
<td>-0.08</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>0.31</td>
<td></td>
</tr>
</tbody>
</table>

$\Delta R^2 = 0.68$; $\Delta F = 32.67*(5, 76)$; $\Delta R^2 = 0.10$; $\Delta F = 37.85*(7, 74)$

Note. $^a$ coded as 1 = same sex dyad and 2 = different sex dyad. $^b$ coded as 1 = traditional certification and 2 = certification other than traditional $^* = p < .05$

For Friendship, the covariate regression model explained a significant, $F = 32.72(5, 76, p < .05)$, (adjusted $R^2 = .66$) proportion of variance in support received. Again, Perceived Similarity ($d = 2.11$) was the only covariate to explain a large (Cohen, 1992) proportion of variance in the Friendship function (see Table 4). The addition of Expectation Congruency and Interaction to the covariates in Model 2 for Friendship also yielded a significant, $F = 35.22 (7, 74, p < .05)$ regression model. The addition of Expectation Congruency and Interaction explained an additional nine percent of variance ($\Delta R^2 = 0.09$) and significant $\Delta F = 13.83(2, 74, p < .001)$ as compared to Model 1. The investigator rejected null hypothesis one for the Friendship function in favor of the alternative hypothesis, which stated Expectation Congruency and Interaction accounted for a significant ($p < .05$) proportion of variance in the Friendship function, even when controlling for known covariates.
Table 4

Hierarchical Regression of Friendship Mentor Support Received on Interaction and Congruent Expectations (n = 82)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE B</td>
</tr>
<tr>
<td>(Constant)</td>
<td>0.65</td>
<td>1.16</td>
</tr>
<tr>
<td>Same-Sex dyad a</td>
<td>0.14</td>
<td>0.26</td>
</tr>
<tr>
<td>Similarity</td>
<td>0.82*</td>
<td>0.09</td>
</tr>
<tr>
<td>Program Understanding</td>
<td>0.35*</td>
<td>0.17</td>
</tr>
<tr>
<td>Certification Type b</td>
<td>0.06</td>
<td>0.31</td>
</tr>
<tr>
<td>Proactiveness</td>
<td>-0.18</td>
<td>0.15</td>
</tr>
<tr>
<td>Congruent Expectations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction (hours/week)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adjusted $R^2$                      | 0.66  |      |      | 0.74  |
$R^2$ Change                        | 0.68  |      |      | 0.09  |
$F$                                 | 32.72*(5,76) |      |      | 35.22*(7,74) |

Note. a coded as 1 = same sex dyad and 2 = different sex dyad. b coded as 1 = traditional certification and 2 = certification other than traditional. * = $p < .05$

For Role Model support, the overall covariate model was significant, $F = 33.92(5, 76, p < .05)$, as Model 1 explained 67% (adjusted $R^2 = .67$) of the variance in Role Modeling support (see Table 5). Among the covariates, only Perceived Similarity ($d = 2.16$) explained a large (Cohen, 1992) proportion of variance. Expectation Congruency and Interaction in Model 2 also yielded a significant, $F = 37.90 (7, 74, p < .05)$ regression model. Model 2 also explained a significant (adjusted $R^2 = 0.76$) proportion of the variance in Role Model support and was significantly, $\Delta F = 15.50(2, 74, p < .001)$, more accurate in predicting support than Model 1 ($\Delta R^2 = 0.09$). The author rejected the null hypothesis for Role Model function in favor of the alternative hypothesis, which stated Expectation Congruency and Interaction accounted for a significant ($p < .05$) proportion of variance in Role Model support received, when controlling for known covariates.
Table 5
Hierarchical Regression of Role Model Mentor Support Received on Interaction and Congruent Expectations (n = 82)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( B )</td>
<td>( SE )</td>
<td>( d )</td>
<td>( B )</td>
</tr>
<tr>
<td>(Constant)</td>
<td>-0.06</td>
<td>1.14</td>
<td>0.01</td>
<td>-1.11</td>
</tr>
<tr>
<td>Same-Sex dyad (^a)</td>
<td>0.12</td>
<td>0.26</td>
<td>0.11</td>
<td>0.18</td>
</tr>
<tr>
<td>Similarity</td>
<td>0.82*</td>
<td>0.09</td>
<td>2.16</td>
<td>0.54*</td>
</tr>
<tr>
<td>Program Understanding</td>
<td>0.33</td>
<td>0.17</td>
<td>0.44</td>
<td>0.13</td>
</tr>
<tr>
<td>Certification Type (^b)</td>
<td>0.12</td>
<td>0.31</td>
<td>0.09</td>
<td>0.28</td>
</tr>
<tr>
<td>Proactivity</td>
<td>-0.11</td>
<td>0.15</td>
<td>0.17</td>
<td>-0.04</td>
</tr>
<tr>
<td>Congruent Expectations</td>
<td>0.49*</td>
<td>0.09</td>
<td>1.28</td>
<td></td>
</tr>
<tr>
<td>Interaction (hours/week)</td>
<td>-0.10</td>
<td>0.06</td>
<td>0.40</td>
<td></td>
</tr>
</tbody>
</table>

\( \text{Adjusted } R^2 \)          | 0.67 | 0.69 | 0.76 | 0.09 |
\( R^2 \text{ Change} \)             | 0.69 | 33.92*(5,76) | 37.90*(7,84) |
\( F \)                               | 33.92*(5,76) | 37.90*(7,84) |

Note. \(^a\) coded as 1 = same sex dyad and 2 = different sex dyad. \(^b\) coded as 1 = traditional certification and 2 = certification other than traditional. * = \( p < .05 \)

Researchers regressed the Acceptance support construct against potential covariates in Model 1 (see Table 6). The covariate model was significant, \( F = 32.98(5,76, p < .05) \), as systematic variation in Same-Sex Dyad, Perceived Similarity, Certification Type, Program Understanding, and Proactivity explained sixty-six percent (adjusted \( R^2 = .66 \)) of the variance in the beginning teacher Acceptance function. As with the other support constructs, Perceived Similarity (\( d = 2.08 \)) explained a large (Cohen, 1992) proportion of variance in the covariate model. The full regression model, Model 2, was also significant, \( F = 32.29 (7, 74, p < .05) \), whereas the contribution of Expectation Congruency, Scope of Interaction, and covariates explained a significant (adjusted \( R^2 = 0.73 \)) proportion of the variance in the Acceptance function. The addition of Expectation Congruency and Interaction explained an additional seven percent of variance in the acceptance function of mentors (\( \Delta R^2 = 0.07 \)) and accounted for a significant change in the predictive capability of the regression model, \( \Delta F = 10.33(2, 74, p < .001) \) as compared to Model 1. Therefore, the author rejected null hypothesis one for the acceptance function in favor of the alternative hypothesis, which stated Expectation Congruency and Interaction accounted for a significant (\( p < .05 \)) proportion of variance in the Acceptance function when controlling for known covariates.
Table 6
Hierarchical Regression of Acceptance Mentor Support Received on Interaction and Congruent Expectations (*n = 82*)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE B</td>
<td>d</td>
<td>B</td>
<td>SE B</td>
<td>d</td>
</tr>
<tr>
<td>(Constant)</td>
<td>0.99</td>
<td>0.95</td>
<td>0.24</td>
<td>0.31</td>
<td>0.87</td>
<td>0.08</td>
</tr>
<tr>
<td>Same-Sex dyad a</td>
<td>-0.05</td>
<td>0.22</td>
<td>-0.06</td>
<td>-0.01</td>
<td>0.19</td>
<td>-0.02</td>
</tr>
<tr>
<td>Similarity</td>
<td>0.66*</td>
<td>0.07</td>
<td>2.08</td>
<td>0.44*</td>
<td>0.08</td>
<td>1.27</td>
</tr>
<tr>
<td>Program Understanding</td>
<td>0.25</td>
<td>0.14</td>
<td>0.40</td>
<td>0.05</td>
<td>0.14</td>
<td>0.08</td>
</tr>
<tr>
<td>Certification Type b</td>
<td>-0.16</td>
<td>0.26</td>
<td>-0.14</td>
<td>-0.01</td>
<td>0.23</td>
<td>-0.01</td>
</tr>
<tr>
<td>Proactivity</td>
<td>0.06</td>
<td>0.13</td>
<td>0.10</td>
<td>0.13</td>
<td>0.12</td>
<td>0.26</td>
</tr>
<tr>
<td>Congruent Expectations</td>
<td></td>
<td></td>
<td></td>
<td>0.35*</td>
<td>0.08</td>
<td>1.03</td>
</tr>
<tr>
<td>Interaction (hours/week)</td>
<td></td>
<td></td>
<td></td>
<td>0.02</td>
<td>0.05</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Adjusted $R^2$                   | 0.66    | 0.73     |
$R^2$ Change                     | 0.69    | 0.07     |
$F$                              | 32.98*(5,76) | 32.29*(7,74) |

Note. a coded as 1 = same sex dyad and 2 = different sex dyad. b coded as 1 = traditional certification and 2 = certification other than traditional. * = $p < .05$

Conclusions/Implications/Recommendations

For beginning teachers participating in this mentor/induction program, differences in Perceived Similarity and Expectation Congruency have both statistical and practical significance in predicting mentor support received in the Counseling, Friendship, Role Model, and Acceptance mentor support functions, even when accounting for potential covariates.

Among the independent variables included in this study, Perceived Similarity was the best predictor of mentor psychosocial support received by beginning agriculture teachers; Perceived Similarity explained a large proportion of variance in psychosocial support received across all five support constructs. These findings support previous research in agricultural education by Greiman (2003), Kitchel (2005), and Burris et al. (2006) who described a very strong positive correlation between Perceived Similarity and mentoring relationship satisfaction among student teachers, beginning teachers, and their mentors. Jones, Kelsey, and Brown (2014) describe shared personality dispositions between mentor and protégé as the foundation of agriculture teacher mentoring.

Perceived similarity in attitudes, beliefs, values, and personality between mentors and protégés is the primary antecedent for mentor relationship development across a variety of mentoring contexts (Eby et al., 2013). However, Mitchell, Eby, and Ragins (2015) suggest the Perceived Similarity construct may function independently from actual similarity between mentor and protégé. So what factors could explain feelings of Perceived Similarity? Among agricultural student teachers, Kitchel and Torres (2006) found no association between personality type and mentoring received. Do beginning agriculture teachers from non-traditional backgrounds experience feelings of Perceived Similarity with their mentors? If so, how? Is Perceived Similarity a dynamic construct which can be manipulated? Researchers recommend state staff consider
Perceived Similarity as a primary criterion when matching mentors and beginning teachers. We recommend mentor program facilitators teach mentors the importance of Perceived Similarity in the mentoring relationship and provide adequate time at the beginning of the relationship to foster feelings of similarity. Future research should investigate factors that contribute to feelings of Perceived Similarity for beginning agriculture teachers.

Expectation Congruency is a unique and important predictor of mentor support received by beginning teachers in the Counseling, Friendship, Role Model, and Acceptance functions. For beginning agriculture teachers participating in the Missouri formal mentoring program, increased levels of Expectation Congruency, on average, should lead to higher levels of Counseling, Friendship, Role Model, and Acceptance support received. Researchers conclude differences in Expectation Congruency do not explain a significant proportion of variance in the Social support function. Within the psychosocial constructs where beginning teachers felt supported to a large extent, these findings support Mentor Schema Theory (Ragins & Verbos, 2007), as differences in mentoring support were predicted to a large extent by variations in Expectation Congruency.

Beginning teachers, on average, moderately agreed they shared congruent expectations with their mentors. Murphy and Freiheit (2013) theorized receipt of training was significantly predictive of expectation congruency; mentors who receive high-quality training reported significantly higher levels of commitment and program understanding (Allen et al., 2006). All mentors and protégés in this sample received identical training at the start of the experience, which could explain the high level of congruency, but raises questions about why responses varied along the entire range of the instrument. Teacher educators should prepare preservice teachers for mentoring by addressing the potential for unrealistic expectations and providing strategies for beginning teachers to align expectations with their mentor. A recommendation for school administrators would be to emphasize the importance for mentors and beginning teachers to generate shared mentoring goals and outcomes, particularly in the beginning stages of the relationship (Dansereau Jr., Graen, & Haga, 1975; Young & Perrewé, 2004). The authors also recommend administrators prioritize practices, which can facilitate congruent expectations among beginning teachers and their assigned mentor. Researchers recommend future investigation on which factors explain differences in mentoring expectations of beginning agriculture teachers.

Researchers conclude beginning teachers, on average, feel supported to a large extent in the psychosocial constructs of Friendship, Acceptance, Counseling, and Role Model functions. These four functions are the original psychosocial support constructs initially identified by Kram (1985). Beginning teachers, on average, feel supported to some extent by their mentor teachers in the Social function; the Social function was added as a psychosocial mentoring function at a later date by Ragins and McFarlin (1990). The results of this study are consistent with Greiman’s (2003) findings regarding beginning agriculture teachers and their mentors, and his assertion mentors from a different school may not be able to provide Social functions (i.e. “socializing with you one-on-one outside of work”) at the same level as the other psychosocial support functions. Perhaps beginning teachers don’t expect Social support from their assigned mentor? Perhaps the mentoring environment does not support that type of psychosocial support. Since the Social construct was later added to the Kram (1985) model, it is recommended to investigate the necessity of this construct for the agriculture teacher construct.

The average beginning teacher spends a small part of their work week interacting with their formally assigned mentor. Torres et al. (2012) reported two-thirds of beginning agriculture teachers were working in excess of 55 hours each week, yet today’s beginning agriculture teacher reports interacting with their mentor an average of 1.44 hours each week. Although today’s mentors are
interacting with beginning teachers, on average, almost two hours less per week today than in the 2001-2002 cohort group, today’s beginning teachers are reporting similar levels of mentor support as those from 10 years previous. This could imply today’s mentors are more efficient with their mentoring time when interacting with beginning teachers. Another potential implication is technology has enhanced a mentor’s ability to meet the needs of the beginning teacher. Do beginning teachers in the current study could have different expectations for support as compared to those in the 2001-2002 cohort group? Future research should investigate the variation in content and format of mentor/protégé interactions.

Differences in Interaction time between mentors and beginning teachers had limited capability in predicting psychosocial support received. Interaction was chosen as a variable of interest based on previous research (Greiman, 2003) where agriculture teacher mentors and protégés stated a lack of time to meet, mentor, and observe were the biggest barriers to mentoring. Although lack of time was not directly addressed, an implication of this study is increased interaction time does not necessarily lead to increased mentor support. Other mentoring research (Allen, 2007; Allen & Eby, 2003; Lankau, Riordan, & Thomas, 2005) suggested interaction frequency is not related to reports of psychosocial mentoring support. Ragins’ and Verbos’ (2007) Mentor Schema Theory (Ragins & Verbos, 2007) suggests mentoring happens in small, developmental interactions; however, these findings indicate the quality, not necessarily the quantity, of mentoring interactions are important for mentor support. Further research should examine how mentors interact with beginning teachers and if variation in time explains variation in career support functions.

The variables of Same-sex dyad, Certification type, and Proactivity have limited ability to predict variations in psychosocial support received by agriculture teacher protégés. The previous research on matching dyads by sex (Allen & Eby, 2003; Scandura & Williams, 2001; Wanberg et al., 2006) is inconclusive; this study supports the notion same-sex pairing explains little variation in mentoring outcomes. Previous researchers in Agricultural Education (Duncan & Ricketts, 2008; Roberts & Dyer, 2004) suggest traditional and alternatively certified teachers differ in their professional support needs. These findings were not supported by this study, although the author concedes it is possible traditionally and alternatively certified teachers differ in professional support needs beyond the factors included in this study. One study of formal mentoring programs (Wanberg et al., 2006) suggested protégé proactivity was related to increased psychosocial mentoring. However, this study does not support the notion proactivity is either positively or strongly predictive of psychosocial support received by beginning agriculture teachers.

The author concluded Program Understanding, that is, understanding of the mentoring program, has potential for explaining variation in psychosocial support received by beginning agriculture teachers, particularly in the Counseling and Friendship functions. In a study of formal mentors and protégés, Allen et al. (2006) found Program Understanding was significantly predictive of perceived Program Effectiveness for both mentors and protégé. The author concludes this study supports previous research, in Program Understanding does explain unique variance in support received; however, variation in Expectation Congruency and Interaction may mediate the unique predictive capability of Program Understanding for this population.

Although the researcher found no perfect multicollinearity among independent variables, the researcher notes multicollinearity may influence the regression equation, as the average VIF statistic exceeded the 1.0 threshold suggested by Bowerman and O'Connell (1990). We recommend program administrators consider Perceived Similarity as an important criterion when matching mentor dyads. Further, mentors should guide early mentoring interactions to help mentors and beginning teachers identify similarities and define the terms of the mentoring relationship. Future qualitative research could investigate the phenomenon of a beginning teacher experiencing an
induction program and compare experiences of traditionally and alternatively prepared agriculture teachers.

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Influence of Knowledge of Content and Students on Beginning Agriculture Teachers’ Approaches to Teaching Content

Amber H. Rice and Tracy Kitchel

Abstract

This study explored experiences of beginning agriculture teachers’ approaches to teaching content. The research question guiding the study was: how does agriculture teachers’ knowledge of content and students influence their process of breaking down content knowledge for teaching? The researchers employed a grounded theory approach in which five beginning teachers were interviewed and observed teaching a lesson. The researchers found beginning teachers’ knowledge of content and students greatly influenced how they broke down content knowledge for student understanding. Five major themes emerged: students’ prior knowledge and enrollment in sequences of courses influenced content covered, student engagement methods were not primarily driven by content, differing perceptions of content difficulty for students shaped teaching decisions, deconstructing content for students was deemed important by teachers, and teachers engaged in a form of learning egocentrism. These findings support further research on teachers’ development of pedagogical content knowledge, including knowledge of content and students overtime as it was found to be an influential knowledge base. Recommendations include providing teachers with more opportunities to explore integrating student’s prior knowledge into the curriculum and incorporating student thinking about agriculture content more specifically in teacher preparation.

Keywords: Pedagogical Content Knowledge; Knowledge of Content and Students; Beginning Agriculture Teachers; Content Knowledge

Introduction

Pedagogical content knowledge (PCK), is a knowledge base for teaching that exists at the juncture of content knowledge and pedagogical knowledge (Shulman, 1986). Teachers who possess PCK can effectively create representations for concepts, recognize student preconceptions and misconceptions of content, and sequence curriculum to enhance student learning (Shulman, 1986). Effective preparation of teachers includes a focus on PCK development. In fact, CAEP (2013) standards for accreditation of teacher preparation list possession of PCK as their first standard. Teacher candidates are expected to develop foundational content knowledge in their particular discipline and to cultivate ways to best present that knowledge to their students, which includes knowledge of instructional strategies, learner development, learner differences, assessment, and application of content, among others (CAEP, 2013).

Teacher and teaching quality, including teacher knowledge about content and pedagogy, can greatly impact student achievement (Kaplan & Owings, 2002). In a quantitative study of elementary teachers, teachers’ mathematical content knowledge positively predicted student achievement in mathematics (Hill, Rowan, & Ball, 2005), demonstrating the importance of a strong content knowledge base for mathematics teachers. However, content knowledge alone, while

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1 Amber H. Rice is an Assistant Professor in the Department of Agricultural Education in the College of Agriculture and Life Sciences at the University of Arizona, 1110 E. South Campus Drive, Tucson, AZ, 85721, amrice@email.arizona.edu
2 Tracy Kitchel is a Professor and Chair in the Department of Agricultural Communication, Education, and Leadership in the College of Food, Agricultural, and Environmental Sciences at The Ohio State University, 208 Ag Admin Building, 2120 Fyffe Road, Columbus, OH, 43210, kitchel.2@osu.edu
recognized as an imperative knowledge base by researchers, is not the only type of knowledge teachers need to be effective (Baumert et al., 2010). Transforming content knowledge for student understanding requires teachers to use their PCK (Halim & Meerah, 2002), indicating PCK is the greatest single contributor to explaining student progress (Baumert et al., 2010).

An important component of PCK is knowledge of content and students. A framework of mathematical knowledge for teaching developed by Hill, Ball, and Schilling (2008), sought to delineate and elaborate upon individual components of PCK. Their framework was divided into six domains and two groups. The first group was subject matter knowledge. The second group was specifically PCK which included three domains: knowledge of content and students, knowledge of content and teaching, and knowledge of content and curriculum. Teachers’ knowledge of content and students was described as the combination of knowledge of how students think and learn content with content knowledge in a particular subject matter area (Hill et al., 2008). Components of knowledge of content and students as discovered by Hill et al. (2008) included: common student errors, student understanding of content, student developmental sequences, and common student computational strategies.

Investigation into the impact of knowledge of content and students is crucial for future PCK research. In a study of novice mathematics teachers, knowledge of content and students was a pivotal point for PCK development for the majority of beginning teachers (Lannin et al., 2013). Recent calls for empirical research in PCK include further establishing the connection between PCK and its effect on student learning (Gess-Newsome, 2015). Examining this knowledge base specifically in agriculture teachers could provide information to teacher educators on how to train preservice teachers and develop professional development initiatives for inservice teachers (Rice & Kitchel, 2015), with the end goal of increasing student understanding and retention of agriculture knowledge.

Review of Literature

Since its conception as a construct, research has been conducted within various education disciplines and numerous frameworks have been developed in an attempt to elucidate the complex nature of PCK (Chick, Baker, Pham, & Chang, 2006; Gess-Newsome, 2015; Hill et al., 2008; Hashweh, 2005; Lee, 2011; Loughran, Berry, & Mulhall, 2012; Magnusson, Karjicik, & Borko, 1999). Recently at an international summit on science PCK, a consensual definition for PCK was established and elaborated on by experts in the field. PCK was defined as the knowledge of, rationale behind, planning for, and act of teaching a specific piece of subject matter, in a specific context, to support student learning of the material (Gess-Newsome, 2015). This definition focused on the topic specific nature of PCK (Darling-Hammond & Bransford, 2005; Etkina, 2010; Van Driel & Berry, 2012), further necessitating research specifically for agricultural education, which may be unique to core content area disciplines such as mathematics or English due to the breadth and depth of content that can be covered in an agriculture classroom (Barrick & Garton, 2010).

Despite the espoused importance of PCK throughout the body of research in teaching and learning, various studies spanning education disciplines from mathematics to science to music have indicated that teachers are still grappling with development of this knowledge base and its applications in the classroom (Kind, 2009; Ball, Thames, & Phelps, 2008; Ballantyne & Packer, 2004). In particular, preservice and beginning teachers are routinely identified as lacking PCK (Borko et al., 1992; Diakidoy & Iordanou, 2003; Halim & Meerah, 2002; Van Driel, Verloop, & DeVos, 1998). Researchers investigating the PCK of preservice music education teachers found that despite having a strong background in music content, many of the preservice teachers were unable to apply that content knowledge and related skills to their classroom instruction (Ballantyne & Packer, 2004). Experience in the field is one of the most effective ways to develop PCK (Hashweh, 2005; Nilsson, 2008); however, without a framework to guide them beyond teacher
preparation, teachers may not be equipped to continually develop and refine this knowledge. Ballantyne and Packer (2004) recommended a more overt focus on the PCK development of preservice teachers during the teacher preparation phase.

In addition to research in the field of mathematics, science education has also contributed heavily to the current knowledge base on PCK (Berry, Friedrichsen, & Loughran, 2015; Kind, 2009). Pedagogical and Professional Experience Repertoires (PaPeRs) and Content Representations (CoRes) were developed by Mulhall, Berry, and Loughran (2003) to make explicit teachers thinking about content. An important component of both frameworks included information related to how knowledge about student thinking influences the teaching of an idea including: predicting students’ difficulty with particular content, developing specific strategies to make sure students are understanding content, and withholding certain content for students developmental and contextual needs, among others (Loughran et al., 2012). A recent study with science preservice teachers documented use of the CoRe rubric tool and confirmed its value in raising awareness for and building inexperienced teachers’ PCK (Hume & Berry, 2011). Using the contextual framework of PCK, teachers’ skills can be thoroughly examined and understood (Abell, Park Rogers, Hanuscin, Lee, & Gagnon, 2009). Focusing on beginning agriculture teachers in the crucial stages of developing their PCK and describing their process of breaking down content knowledge could be an important starting point for PCK research in agricultural education.

Central Research Question and Purpose

The central research question for this study was: How does agriculture teachers’ knowledge of content and students influence their process of breaking down content knowledge for teaching? The purpose of this study was to explore the impact of teachers’ knowledge of content and students on their process of breaking down agriculture content utilizing grounded theory methods. This research question aligns with the 2016-2020 National Research Agenda for agricultural education priority four, meaningful and engaged learning in all environments (Roberts, Harder, & Brashears, 2016).

Methods

The data analyzed were part of a larger study that sought to examine the process beginning agriculture teachers engaged in when breaking down their content knowledge for student understanding in the classroom (Rice & Kitchel, 2016). Many of the methods will be consistent with or identical to the larger study. The findings in this manuscript focused on teachers’ knowledge of content and students and its influence on their teaching. Grounded theory methodology was utilized for data collection and analysis because it is an appropriate method for investigating an undefined process (Corbin & Strauss, 2008). Other empirical studies have successfully used grounded theory methodology in their investigation of PCK (Van Driel et al., 1998). Additionally, research on agriculture teachers’ deconstruction of content knowledge and specifically knowledge of content and students is limited in agricultural education. Specifically, my methodology was guided by the work of Corbin and Strauss (2008). Similarly, to Corbin, I identify as a pragmatist. My goal for this research is to investigate questions that have implications for practice, particularly for agriculture teacher preparation programs and inservice teacher professional development. Corbin and Strauss’s (2008) guidelines for conducting grounded theory fit well with my theoretical lens and therefore were appropriate in guiding this research study. My personal bias influenced the lens in which I viewed the study and included my experience as a high school agriculture teacher who entered the field without a traditional agriculture production background. In my current position as a teacher educator, I witness firsthand the struggles that many preservice agriculture teachers face as they develop their content knowledge, pedagogical knowledge, and PCK for teaching agriculture.
Site and Participants

Approximately five to seven years teaching experience in the field is when expertise begins to be achieved (Darling-Hammond & Bransford, 2005). With this in mind, Missouri agriculture teachers with a range of two to four years of classroom experience were chosen to keep the focus on beginning teachers. First year teachers were excluded from consideration of this study because they would not be able to compare their thoughts and strategies over the course of multiple years. All participants recruited were purposefully graduates of the University of Missouri and had similar teacher preparation courses and experiences. Thirteen teachers fit these criteria; in addition to being within a 180-mile radius of the university so fieldwork could be conducted. Out of these thirteen teachers, five agreed to participate in the study. Due to the variation in content that can be taught in an agricultural education program, the decision was made to focus on a lesson integrating science concepts, primarily plant or animal science. The participants consisted of two males and three females. Two of the participants were teachers in the same school district. One teacher had two years’ experience, three teachers had three years’ experience, and one teacher had four years’ experience. One of the teachers was in a single teacher department and the rest were currently in a multi-teacher department but may have worked in a single teacher department in previous years. Four of the teachers were employed in schools in rural school districts and one of the teachers was employed in a suburban school district.

Data Collection

Multiple forms of data were collected as this was part of a larger study. First, data were collected using video recorded classroom observations of one class period for each teacher lasting at least 45 minutes in length. Second, field notes were taken during the observation of the lesson to capture reactions of students and interactions between the teacher and students not captured on video. Observations were an important data collection point to create a comprehensive picture of the deconstructing phenomenon because often people are either not aware of what they are doing or are unable to accurately recall what happened (Corbin & Strauss, 2008). Third, one-on-one semi-structured interviews were conducted following the observation and were 30-45 minutes each. Preliminary interview questions included: what are the things that prepared you to know the content of this lesson well, what are the most important concepts in this lesson, what strategies or methods do you use to teach this lesson and why, what difficulties and limitations are associated with teaching this lesson, and how do you know when your students have learned the content in this lesson. These questions evolved throughout the grounded theory process to meet the needs of the concepts being investigated (Corbin & Strauss, 2008). As data collection and analysis continued, teachers in the study were contacted via e-mail for follow-up information as a part of the constant comparative analysis of grounded theory. The data from these e-mails were used to corroborate findings and establish relationships between data. All video and audio recordings were transcribed verbatim.

Data Analysis

To analyze the data, field notes from the observations, transcriptions of the teaching videos, and transcriptions from the interviews were used to achieve triangulation of the data (Creswell, 2013). As recommended by Corbin and Strauss (2008), analysis involved open, axial, and selective coding. To form initial codes, NVivo 10 software was utilized. As data were collected, a constant comparative method was used to compare data against data (Corbin & Strauss, 2008). Additionally, interview questions were adapted to follow emergent categories. A good portion of data analysis centered on the axial coding phase looking for relationships amongst the data. These relationships were then used as the basis for the selective coding phase and subsequently the findings.
Because this was part of a larger exploratory study, the findings are discussed in themes, and a substantive theory is not presented in this manuscript. Following recommendations of Charmaz (2006) sometimes emergent concepts from a grounded theory study can be so rich they warrant deeper exploration and may not be best represented as a model. However, it is important to note that a substantive theory depicted as a model was developed and presented in the larger study (Rice & Kitchel, 2016). In developing the themes, memoing and writing up the final findings were crucial exercises to make sense of the data. Using writing as a tool for meaning making fits with Denzin and Lincoln’s (2000) argument that writing is not simply the end product of the research process but a way to inquire into the process. To ensure trustworthiness of the original data, member checking was utilized as the study evolved (Creswell, 2013). Credibility of the data was insured by the richness of the data obtained and reflexivity through memoing throughout the data collection and analysis process. Additionally, relevant literature in the field provided sensitizing concepts for this study (Corbin & Strauss, 2008).

**Findings**

Beginning teachers’ knowledge of content and students (and lack thereof) greatly influenced how they broke down content knowledge for student understanding. Specifically, five major interwoven themes emerged through data analysis regarding how this unique knowledge base influenced teaching agriculture content.

**Students’ Prior Knowledge and Enrollment in Sequences of Agriculture and Science Courses Influenced Type and Depth of Content Covered by Teachers**

All of the teachers in the study referenced making an effort to consider their students’ prior knowledge in the content when planning and teaching their lessons. This included prior knowledge from other agriculture classes the students had taken and prior knowledge from core content classes such as biology or chemistry. In my field observations, multiple teachers referenced to students they had learned certain pieces of content in 6th and 8th grade. Often, the students recognized their own prior knowledge and communicated that to the teacher. In an observation of a plant science lesson with Tiffany, one of the students commented they had to know the formula for photosynthesis for their biology class, as well. Tiffany responded by emphasizing the cross-curricular nature of the content. In the same lesson, when she was explaining cellular respiration, Tiffany asked the students if they had learned this yet in their biology course, possibly prompted from the previous student interaction.

In the interview following the lesson, Tiffany stated, “We do talk about plant science in 8th grade, I reminded them of that today. I want to be a step up from that, but I also want to leave them something to learn in plant science in greenhouse class.” Tiffany was from a single teacher department, so she knew she would be having many of these same students in future classes. Agriculture teachers have to balance curriculum across multiple courses and attempt to avoid unnecessary repetition or leaving out certain content. Jordan discussed how he had to balance content across multiple agriculture courses in order to teach all of the content he felt was important for students to learn. “You just look for ways to maybe incorporate [content] in other classes or try to switch out your class and that’s where you can cover the information you want to cover.”

In some schools, there was an effort to teach complimentary curriculum across subject areas to increase transfer. Tiffany elaborated,

So I am kind of getting a sense now of stuff that I either withhold or go ahead and teach them. I know where they are at in their other classes, so it’s trying to work with that so they are hearing the same level of stuff in my class that they are hearing in other classes.
In multi-teacher departments sometimes the pressure wasn’t just to teach complimentary content across the different disciplines, but also to be consistent with other agriculture courses. Melissa reflected on her efforts to keep the content the same. “There’s a big push to make your classes similar. If another agriculture teacher is teaching wildlife, then our curriculum is the same.” As the newest and youngest teacher in her department, Melissa often felt like she was the one who had to adapt her content. “I know that they are not going to change what they are teaching since they have been here, so I have been trying to take the big idea of what they are teaching and teach that.”

**Student Engagement Methods in the Classroom were not Primarily Driven by the Nature of the Content**

A common method to engage students in the classroom was to have them participate in activities. Engagement of students seemed to be a struggle for many of the teachers. Jeff discussed his engagement strategies for a parliamentary procedure lesson and his frustration with keeping students engaged in the content. “I throw the video in there. That’s the number one problem I run into though is engagement and keeping kids focused on the topic, especially on some very hard and boring stuff.” Jeff referred to learning how to take minutes in a meeting, the content he was covering that day in class, as difficult and boring on multiple occasions throughout the interview.

When I asked Melissa about how she decided what methods were best suited for teaching specific content, her answer had very little to do with the actual content itself.

It probably depends on whatever I have done in the class before because I don’t want to do lecture every time. If I have just done a research project, I don’t want to do that same thing with kids that next class period. For me, that is probably the driving factor in whether I am going to study and read up on this or am I going to create a project for them to research or do a group project on. Right now that is probably my driving factor, making the class different so I can try to engage them.

While student engagement is important for learning to take place, the role of content was often absent in the decision. Instead, the focus was more on keeping the students entertained than how to best represent a particular piece of content for student understanding.

**Differing Perceptions of what Content is “Difficult” for Students Shaped Teaching Decisions and Reflection**

Another component of knowledge of content and students that influenced how the teachers approached the content was the difficulty or perceived difficulty of the content for the students. Tiffany described her experience with teaching content in a farm management course during her interview. “When I taught it the first time, elasticity of demand blew a few kids’ minds. It was to the point where we took a test and they just didn’t even try it.” Jeff commented on how effort was one of the biggest problems he saw with teaching content to students. Students’ negative experiences with difficult content in previous classes also influenced how teachers created interest and tried to motivate them to be excited about agriculture content. Tiffany described how this unfolded in her plant science unit. “They bring negative opinions about the content. I say this is biology to try and get them to relate to biology class. Turns out they hate biology class and they just shut down.” Plant science was not the only content area Tiffany experienced students shutting down. She described a similar instance in the aforementioned farm management course showcasing how students’ negative experiences with content extended beyond the sciences. “There are kids that refused to take a math class beyond what they had to and they are sitting there during any of our equations and they are shutting down, not listening, and not even trying.”
In response to the perceived difficulty or negative experiences, sometimes the teacher decided to focus more on particular content because they felt it was important for the students to learn. Jeff illustrated this with his agriscience class.

The reason I thought to teach parliamentary procedure is our FFA meetings were disasters last year. Nothing happens at their meetings, kids hate going to them, they are not enjoying being around their friends, and it’s because they’re not getting things accomplished. So I thought this was important to do.

Often the teachers experienced frustration with teaching content the students struggled with but they perceived as lower level knowledge. Many of the teachers discussed identification as a topic many of their students struggled to master. Since identification is a component of many career development events (CDEs) within FFA (National FFA, 2012), it was also an important part of the agriculture classroom curriculum and the foundation for future knowledge.

In the lesson on monocots and dicots I observed, I asked Tiffany afterwards what was the most difficult part of the lesson for her students to understand. She responded, “Maybe just the sight identification of monocots and dicots, like they can describe them but they can’t identify them….There will be times when they seem to get it and then something will throw them.” Tiffany began spending more time on identification in plant science because her students were struggling. “Identification with the plant science stuff is an area that they have struggled with and that’s why we have started hitting it a little harder this year.” Melissa described identification as being a barrier to student learning. “Weed and grass identification, that was really hard, just the ID-ing part, getting them to differentiate between plants and why is this plant this one. That was probably one of the difficult things.” Beyond the plant sciences, animal science identification and terminology was also an area of concern. Mary indicated terminology in relation to veterinary science and animal science was an area in which her students struggled to grasp the content. “If they haven’t taken anatomy yet then they struggle a lot with the different parts of the body and the different bones and the technicality of it.”

Tiffany described her frustration with re-teaching identification and her students still not grasping the material:

And I’m not understanding. I feel like I’ve been through it enough that when we go through contests I can identify all the plants and they still don’t know. There’s some jump that they are not making in terms of identification and like I said before I think that’s a really important part of plant science.

Many of the teachers experienced frustration with this perceived “easy” content and the students’ difficulty with mastery. Melissa described her reflection on re-teaching content. “I have struggled with trying to go back and say, oh shoot, I needed to teach that better because I can’t just rattle that off [specific content terminology] and them [students] understand it because they don’t really know.”

Another component to the teachers’ perceived student difficulty with content centered on where the students were developmentally in terms of content knowledge acquisition. I asked all of the teachers during the interview if there was anything they knew about the content they purposefully didn’t cover in class and their rationale for excluding that content. In reference to his lesson on meeting minutes in the parliamentary procedure unit Jeff said, “I mean you don’t want to overload them with information. I’ve seen a lot of teachers teach it with a PowerPoint and they cover twenty motions in one…but the kids don’t know how to use it in action.” Describing a farm management course, Tiffany expressed a similar sentiment:

But we basically talk about the relationship, if the supply is this and the demand is this…but I don’t even try to get my freshmen to really get into that. In farm
management I talk about it enough for them to get the idea behind it, but I’m not going to try to get freshmen to understand economic principles like that. So yeah, with that class I definitely withhold some of it; they know what they need to know to be functional and then the rest of it they wait.

Sometimes the teachers were not sure what their students were developmentally ready for in terms of content. When asked if there was ever any content he withheld Jordan replied, “Yes, partially because of time and partially because I do think it’s over their head whether it’s pertinent or not.” Mary expressed her concern for not knowing what to withhold from students, “Because sometimes I read through this stuff and I am like, do they know this? Should they not know this?” A lack of a defined curriculum in agricultural education could be perpetuating this uncertainty of what content is developmentally appropriate for students.

Deconstructing Content for Students was Deemed Important by Teachers

Many of the teachers discussed how they deconstructed content in a step-by-step fashion beginning with the lowest level knowledge and building from there as a strategy for teaching content. Jeff described deconstructing content in this manner when teaching a lesson in forestry. “You have to slow down and take time to explain and then you reinforce those points every single time. Because if they don’t understand the simplest thing I can’t move on…” Tiffany also describes her reasoning for laying out the content step-by-step. “They are either just not getting it right or they are telling you they don’t get it. So that doesn’t tell me specifically why or where they are lacking. So having them step by step…”

The concept of “forced learning” was one technique utilized by Tiffany when teaching content her students struggled with. To Tiffany, forced learning meant 100% of the content was learned by 100% of her students. She felt it was important to make sure each student understood the basics of content before she was able to build on that content. This technique also involved a step-by-step process of breaking down the content. Tiffany described how this technique worked for her as an intervention strategy.

So I would sit down with them during class and go through it step by step with them until they got it and just force them to think about it. So just sitting there and hanging with them until they understand it one-on-one I think is the most effective intervention.

Often the teachers self-identified as lacking content knowledge in many areas of agriculture. However, some teachers had a specialty area of content in which they had high self-efficacy. Sometimes this expertise in a particular content area could actually be a barrier to breaking down content. When describing a lesson in meat science, an area Jeff had background in from working in a meats lab, he indicated it was hard to explain some of the concepts to the students.

Like on quality grading- Mr. W how do you know that’s prime? Well because it’s prime- you know? That’s a common one. Or how do you know that number three is better than number four [referring to cuts of meat]? Because it is- you know?...The hardest thing is for me to translate things that you just instinctively know into ways for them to understand it.

This frustration Jeff experienced is consistent with literature stating expertise can sometimes be a barrier to teaching because experts don’t always realize the steps they are taking to solve a problem because it has become so automatic (Bransford, Brown, & Cocking, 2000). This phenomenon of struggling to break content down due to expertise in a content area may occur more often in experienced agriculture teachers and could warrant further research.
Teachers Engaged in a Form of Learning Egocentrism

Part of the concept of “forced learning” stemmed from the teacher relating students’ learning with her learning. This is common in education, because teachers often teach how they were taught and how they learned best as students (Darling-Hammond & Bransford, 2005). This egocentric learning philosophy altered the approach many teachers utilized when determining the best methods for teaching content. Instead of investigating the most effective method for teaching content or how students responded to different teaching methods, the teacher taught how they would prefer to learn. Tiffany continues regarding why she used “forced learning” as a technique in her classroom for certain content:

I think that was an area I struggle with and no one ever forced me to think through things...Forcing them to sit there and tell you why they don’t get it and then tell you why they do get it is going to help them a lot.

When referring to another content area, Tiffany again referred to how she learned and its influence on her teaching. “I tell them with math, if I can understand it well enough to teach you, you guys can understand it. I break it down to the absolute lowest level because for me to understand it that’s what I have to do.” It appeared Tiffany was attempting to empathize with her students’ struggle with particular content and wanted to assist them with mastery; however, her methods were still focused on how she personally learned best. Jordan also acknowledged how his own preferences for learning dictated what he chose to do in the classroom. “One time it just come to me in a dream or something or whatever when I’m just thinking back and think what would be cool and what I’d like to do as a student.”

Sometimes the teachers began thinking about their own learning, but were influenced by others to re-examine their thought process. This was evidenced through an interview with Melissa:

I start looking back to when I was in high school and thinking about being on the floriculture team and how hard it was trying to remember all the plants. Now I am like what’s so hard about this? Once you learn it what’s the big deal? The other teacher that does grasslands, that I went to the practices with, I was like it is so much easier now, I don’t get this. He was like it is probably because you have a lot more background experience and knowledge now; certain things stand out more. I was like I guess that’s true. I guess you get more background knowledge as you go and you have done it. But I am sure someone else that has never done it, if they were however old, may not get it either.

It is possible many of the teachers do not realize they have engaged in learning egocentrism, as evidenced by Melissa’s passage above. Looking at the influence of teacher preparation programs on this phenomenon could be important future research.

Discussion

All teachers in the study recognized the importance of students’ prior knowledge in learning new content. This is consistent with literature stating students enter learning environments with preconceptions about content that influences how they grasp future material and the impact this can have on instructional practice (Bransford et al., 2000). However, while the teachers did recognize the importance of students’ prior knowledge, there were many instances where they did not know how to use that awareness to facilitate further learning of agriculture content. This disconnect could potentially impede students’ learning of new content, inhibiting transfer. It is recommended teachers, both at the preservice and inservice level, are provided more opportunities to explore integrating students’ prior knowledge into the curriculum, possibly through inquiry-based learning approaches. The majority of the time, the teachers in this study relied on students’
verbal assertions to assess their knowledge of content. Engaging in pretests before beginning a unit and purposefully designing instruction around those results could strengthen students’ understanding of content. Additionally, the overlap in content from the core content areas, primarily science and math, necessitates working with core content area teachers to align and compliment curriculum. With the emphasis on high stakes testing (NCLB, 2002), this could be one way to substantiate the role of agricultural education in student learning school wide. If the agriculture program or class emphasis is on agriscience, it could be important to work with other science teachers in developing those science concepts across classes and grade levels. Finally, a lack of a defined curriculum in agricultural education could also be a contributing issue to teachers’ decisions of what content to teach in which classes and the appropriate depth of content. Investigation into potential overlap of career pathways (National Council for Agricultural Education, 2009) could be important future research.

While the importance of student engagement pervades educational literature (Trowler, 2010), the emphasis for the teachers in this study was predominately centered on keeping the students entertained and less focused on using certain motivational techniques for particular content. This could lead to teachers not choosing the best methods for teaching content to facilitate student learning. Varying instructional strategies aligns with the principle of teaching and learning, variability, which was taught during teacher preparation to the teachers in this study (Rosenshine & Furst, 1973). However, has this principle, albeit important, been simplified by the preparation program or the teachers themselves to focus primarily on switching up strategies and less on which strategies are best for particular content? Selassie (1989) found the nature of students and students’ intellectual development was less frequently used by teachers in the selection of the method by which material would be presented. Incorporating student thinking about agriculture content more explicitly in teacher preparation could be beneficial in agricultural education. Considering mathematics content from the perspective of the student and solving students’ math problems were important exercises for preservice teachers in a mathematics content-focused methods course and led to the development of informed decisions about how to best teach the content (Steele & Hillen, 2012). Getting into the mindset of a learner and approaching content from that mindset could encourage student engagement with the content, eliminating some of the need for superficial activities.

The difficulty of tasks can also influence student learning. If an assignment is too ‘easy’ a student may become unmotivated because they are bored. The reverse is true if the assignment is too ‘difficult’ (Bransford et al., 2000). Vygotsky’s (1978) zone of proximal development describes the amount of learning a student can accomplish with and without assistance. Knowledge of what was developmentally appropriate for students to know and how much they could learn was a source of concern for teachers in this study, which is a fundamental component of knowledge of content and students (Hill et al., 2008; Loughran et al., 2012). In a self-efficacy study of beginning agriculture teachers, Wolf (2011) reported moderate to low levels of capability for teachers for adjusting lessons to proper levels for individual students. In another agricultural education study, 36% of teachers expressed doubts about students’ capacity to handle integrated science material in agriculture courses (Thoron & Myers, 2009). Investigating ‘students as learners’ courses at the teacher preparation level, which would include information surrounding learning theories, could be important future research. At the university the teachers attended, often the courses on student learning focusing on development were taught by the College of Education and did not focus solely on middle and high school age students, which is the target population of traditional agricultural education programs. This could be contributing to the teachers’ uncertainty about what is developmentally appropriate. Again, lack of a defined curriculum, which includes the flexibility of what content to teach and the community based approach to teaching content, could be another contributing factor related to teachers’ struggles with what content is developmentally appropriate to teach and how to sequence content.
In every teacher interview identification was highlighted as a skill students struggled to master. The teachers expressed frustration with the students’ difficulty with ‘easy’ content. In the revised version of Bloom’s taxonomy (Anderson & Krathwohl, 2001), identification falls under the lowest level in the hierarchy—*remember* (previously called knowledge). A learning objective falling under the *remember* category would include recognizing and recalling information from long-term memory (Anderson & Krathwohl, 2001). The perceived importance of this knowledge could stem from its role as a foundational knowledge base in students or its prevalence in CDEs (National FFA, 2012). Perhaps the frustration with students not grasping identification related content connects to the prior knowledge of students and teacher difficulty in using that knowledge in the classroom to build new content. It is also possible teachers are expecting students to already possess certain knowledge before they enter the classroom. Finally, it could be related to teacher learning egocentrism and teachers having difficulty understanding why such an ‘easy’ concept would be difficult to master. Future research should explore identification, situated within a variety of agriculture content areas, in more detail to pinpoint potential issues or barriers to learning and determine solutions.

Primarily due to their novice status, teachers discussed feeling deficient in various aspects of content; however, some also acknowledged a specialty area in which they excelled. Difficulty in deconstructing content in these specialty areas was expressed by teachers and could be a barrier to student learning. This is consistent with literature acknowledging expertise in a subject can sometimes actually impede teaching because experts forget what is easy and what is difficult for students (Bransford et al, 2000). The teachers in this study emphasized the need to deconstruct content, mostly in a step-by-step fashion, but didn’t always know how to go about this process for specific content. Helping preservice teachers translate content they instinctively know for student understanding is an important component of teaching and should be addressed more explicitly in teacher preparation programs. Additionally, the step-by-step procedure assumes learning occurs in a linear fashion. This could be contrary to inquiry-based learning or other learning techniques and theories. Exploration into the repertoire of methods beginning teachers have for teaching content could uncover any potential weaknesses in or reliance on particular teaching methods.

The teaching strategy ‘forced learning’ was mentioned by one teacher numerous times throughout the interview. It appeared to stem from relating students learning to her learning. Other teachers in the study also indicated that their views of how they personally learned best influenced their choices of teaching methods. Part of this phenomenon of teacher learning egocentrism could be a lack of understanding of how varied students learn. It could also be an inability to look at content in multiple ways, an important part of PCK (Shulman, 1986). Effective teachers need to know multiple ways to approach solving problems and be able to create multiple examples and representations of challenging topics for a wide variety of learners (Grossman, 2005). Teachers often know how to teach content in one way, the way they learned it (Darling-Hammond & Bransford, 2005). With the variety of students in agriculture courses, this is not sufficient. It is also important to acknowledge in Melissa’s interview she addressed how her learning egocentrism was identified by a more experienced teacher and caused her to reflect on her own teaching strategies. Awareness of engaging in teacher learning egocentrism, strategies to avoid it, and additional knowledge and resources about how to represent material in various ways for a variety of students will be important in future preservice and inservice teacher development.

Overall, future research recommendations based on this study include examining a teachers’ development of PCK (including knowledge of content and students) over time. Over the course of a class or a year in the field how does it change and grow and what aspects facilitate or impede the progression? Additionally, because PCK is developed over time as a teacher re-teaches a specific topic (Hashweh, 2005); investigation into expert teachers’ use of knowledge of content and students in the classroom could be important future research. This could further illuminate how
this knowledge base is being utilized in agricultural education and provide important information for future teacher preparation and inservice teacher professional development.

References


Knowledge, Skills, or Attitudes/Beliefs: The Contexts of Agricultural Literacy in Upper-Elementary Science Curricula

Farah L. Vallera¹ and Alec M. Bodzin²

Abstract
Agricultural literacy connects knowledge, skills, and attitudes/beliefs (KSABs) about agriculture to KSABs in environmental education, education for sustainable development, and science education identified in recent reform initiatives. This study conducted a content analysis of 12 current upper-elementary U.S. science textbooks and curriculum programs to examine the representations and contexts of agricultural concepts. The findings revealed the reviewed materials did not include thorough representations of agricultural concepts or a wide distribution of KSABs and lacked systematic development of agricultural concepts. Implications for integrating agriculture into the elementary science curriculum to promote environmental, agricultural, and scientific literacy are discussed, as well as recommendations to guide developers to redesign science curriculum and promote agricultural literacy.

Keywords: agricultural literacy; agricultural education; environmental education; science curriculum; education for sustainable development; elementary

Introduction
During a recent summer tour of a local agricultural education center, a young boy of about 12 visiting from a large urban school district proposed to me a startling question. When the group was asked to note some of the visible and tactile differences between a small, brown chicken egg and a large, white duck egg, the young man inquired, “What’s in them?” I thought for a moment as to how I should answer the question, not quite sure how to explain “an egg”, while lamenting my own assumption that everyone knew what was inside those thin multi-colored shells. After my feeble attempt to explain the cuticle, shell, yolk, and white, he nodded in acknowledgement, “Oh, like in an Egg McMuffin!” His response confirmed what had long been troubling me; U.S. citizens lack sufficient agricultural literacy (Doerfert, 2011; Kovar & Ball, 2013; National Research Council [NRC], 1988).

U.S. citizens hold misconceptions about agriculture that are often led by stereotypical perceptions, such as farmers wearing straw hats and overalls working in barnyards full of clucking chickens, cows, and tractors (DeWerff, 1989; Frick, Kahler, & Miller, 1991; Leising, Igo, Heald, Hubert, & Yamamoto, 1998; Trexler, Johnson, & Heinze, 2000). Elementary school children have been found to interpret agriculture as the farmer, the cow, the tractor, and the rancher (DeWerff, 1989). Unfortunately, teachers’ lack of agricultural knowledge and media-derived stereotypes often match their students’ and have changed little over the last several decades (Anderson, Thompson, & Velez, 2010). This is particularly problematic, since agriculture impacts all of our lives in relation to food and fiber production, the resources and environmental implications involved in their production, and global trade. Introducing agricultural literacy initiatives early in

¹ Farah L. Vallera is an Adjunct Professor of Instructional Technology and Teacher Education in the College of Education at Lehigh University and an instructional designer at Lafayette College, 730 High Street, Easton, PA 18042, fvallera@gmail.com.
² Alec M. Bodzin is a Professor of Instructional Technology and Teacher Education in the College of Education at Lehigh University, 111 Research Drive, Bethlehem, PA 18015, amb4@lehigh.edu.
life can create globally competent consumers who are aware of the countless interconnections within the physical world and help people make better decisions regarding their health, the environment, and the future (Frick et al., 1991).

Agricultural literacy, which differs from agricultural education, includes knowledge, skills, and attitudes/beliefs (KSABs) about the field of agriculture similar to those in science, environmental education, and education for sustainable development (henceforth, ESD; see Figure 1). Although agriculture has largely been removed from U.S. school curricula over the last century, recent science and environmental education reform documents – e.g., *A Framework for K-12 Science Education* (henceforth, *Framework*; NRC, 2012), *Next Generation Science Standards* (henceforth, *NGSS*; NGSS Lead States, 2013), *Excellence in Environmental Education – Guidelines for Learning* (North American Association for Environmental Education [NAAEE], 2010) – have reintroduced it in an attempt to create conscientious citizenry and lifelong learners who understand important interdisciplinary concepts (NRC, 2012).

![Figure 1. Agricultural (Ag.) literacy’s integration within scientific literacy, environmental literacy, and education for sustainable development.](image)

Organizations such as Farm Bureaus, 4-H, cooperative extension agencies, and organizations such as Agriculture in the Classroom have developed scores of instructional materials in response to recommendations for agricultural reintegration. However, most resources are offered as enhancement materials to supplement existing basal textbooks and curricula and have not been aligned to national standards or designed to be integrated coherently into existing instruction, leaving agriculture’s systematic presentation potentially obstructed. Coherent, systematic presentation of curriculum “means that for teachers and students, the learning goals, activities, and assessments align with each other” (Drake & Burns, 2004, p. 19), which can address misconceptions and stereotypical thinking to improve students’ agricultural literacy. Thus, the issue does not stem from a dearth of agricultural materials (Bellah & Dyer, 2009), but in how agriculture is currently embedded in general education. Teachers’ own lack of knowledge, interest, or time may also inhibit agricultural instruction (McReynolds, 1985). To understand students’ exposure to agriculture, this content analysis of upper-elementary U.S. science curricula is the first to examine the representation and contexts of agricultural concepts.

**Agricultural Literacy**

Agricultural literacy differs from agricultural education in that its focus is on educating students about the field of agriculture rather than preparing students for work within the field of
agriculture. According to the NRC’s (1988) report, Understanding Agriculture: New Directions for Education, “Agriculture is too important a topic to be taught only to the relatively small percentage of students considering careers in agriculture” (p. 1) and should be integrated into all grade levels and fields of study. Agricultural literacy encourages understandings about food and fiber systems, global economies, nutrition, and environmental conscientiousness (NRC, 1988). Agricultural educators have constructed definitions necessitating literate students be able to “synthesize, analyze, and communicate” about agriculture (Frick et al., 1991, p. 54), as well as appreciate the values and beliefs within the system to become fully engaged, literate students (Meischen & Trexler, 2003).

(Re)Integration of Agriculture

Historically, agriculture was introduced to all students in all grade levels as a study in science education, appearing in schools in the late 1700s (Dabney, 1904). Its familiarity to students allowed for authentic contexts and experiential learning opportunities (Knobloch & Martin, 2002) and was considered an important topic in all schools – rural, suburban, and urban alike (Hillison, 1998). Over time, however, agriculture became a vocational study no longer integrated into general education. In the 1980s, agricultural literacy efforts emerged and advocated its integration into science and environmental education (Leising, Pense, & Portillo, 2003). According to agricultural educators, agriculture should be integrated into existing K-12 math, science, engineering, technology, and literature curricula (Balschweid, Thompson, & Cole, 2000; Trexler et al., 2000) because its relevance can enhance learning experiences by encouraging students to think deeply about the real world and construct their own knowledge with authentic, tangible examples (Bellah & Dyer, 2009; Knobloch, Ball, & Allen, 2007; Lockwood, 1999).

Science, Environmental Literacy, and Education for Sustainable Development Initiatives

Recent educational reform initiatives within science, environmental education, and education for sustainable development discussed integrating disciplines (including agriculture) to minimize the breadth of disjointed facts and increase the depth of understanding by incorporating crosscutting concepts, practices, and core ideas shared by several fields (NAAEE, 2010; NRC, 2012). Each initiative overlaps with the others, converging on advocacy for the development of citizens who are aware of their impacts on the natural world. Becoming “literate” in each of these fields encourages individuals to make informed decisions regarding important personal and societal issues. Unfortunately, none of the discipline-based literacy definitions has encouraged becoming literate in the other fields as well, which would help individuals grasp the interconnectedness between the disciplines. For instance, to be considered scientifically literate (NGSS Lead States, 2013; Bybee, 1997), students should respect and understand how resources influence their environments, such as “…maintaining supplies of clean water and food, and solving the problems of global environmental change” (NRC, 2012, p. 9). However, being scientifically literate does not mean students are equally environmentally literate. To be environmentally literate (McBeth & Volk, 2010; Roth, 1992), students must develop scientific skills, such as observing and investigating environmental issues experienced in the natural and man-made worlds (NAAEE, 2010); yet becoming environmentally literate does not mean students are also scientifically literate. To understand sustainability (Scott & Gough, 2003; Sterling, 2001), students should plan for a sustainable future, while respecting and preserving the past; but similarly, that does not mean students are scientifically and environmentally literate. However, it is important for students to become literate in each of the fields to make wiser choices as lifelong consumers and recognize their own impacts on the environment and in the world.

Most often these subjects are taught in isolation with minimal integration. Agriculture can link these topics by providing relevant, authentic, and familiar examples and connections students
recognize by acknowledging the resources and products people consume involve (preferably) sustainable scientific processes with environmental impacts (Blum, 1973; Powell, Agnew, & Trexler, 2008), such as studying organic farming methods and how our food gets to our tables. Integrating science into vocational agriculture improved scientific literacy “owing to the synergistic connections between the disciplines” (Rosentrater, 2005, p. 323). Others contend the reverse to also be true: By infusing agriculture into other disciplines, agricultural literacy will likely increase (Conroy & Sipple, 2001; Vahoviak & Etling, 1994). While familiarity does not imply literacy, agricultural literacy contains crosscutting concepts, core ideas, and ties together KSABs about agriculture to those in science, environmental education, and ESD.

**Purpose of Study**

Teachers use adopted textbooks and curricula, particularly when they are unfamiliar with content knowledge (Driscoll, Moallem, Dick, & Kirby, 1994; Stern & Roseman, 2004). Curricula designed well can enhance knowledge acquisition, and those designed poorly can promote misconceptions or stereotypes (Ball & Cohen, 1996). If teachers use adopted materials that lack systematic development of agricultural concepts, agricultural literacy efforts will likely not be achieved. Identifying the extent of agricultural representation and the contexts in which agricultural concepts appear in current materials can provide support and evidence for curriculum reform initiatives’ calls for integrated materials, increased student literacy, science for all, and the leveling of inequality in general education. Such discoveries can also help curriculum and instructional designers locate appropriate places for agricultural integration into new basal textbooks and curricular programs that could be adopted by several states and districts.

The purpose of this content analysis of widely adopted upper-elementary U.S. basal science textbooks and curriculum programs was to determine the representation and context in which agricultural literacy concepts are presented to students in primary education. According to McReynolds (1985), “[t]he earlier in life that we present information [about agriculture] to children, the more receptive they are to accepting and applying wholesome concepts about the topic for the rest of their lives” (p. 17). This study explored the following research questions:

1. To what degree (frequency) are agricultural literacy concepts embedded in upper-elementary science textbooks and curriculum programs?

2. In what contexts (knowledge, skills, or attitudes/beliefs) do agricultural literacy concepts appear within the materials?

**Methods**

Since agriculture has historically been a part of science education, it was fitting to explore its current presence in science curriculum materials. This study employed content analysis of current science materials to provide a systematic and objective examination of agriculture’s presence, as well as to make qualitative inferences about the embedded contexts in which agriculture appeared (Krippendorf, 2004). In this investigation, curriculum was defined as having a scope and sequence of learning activities designed around a science topic that included traditional basal textbooks and other curriculum programs not centered on a primary textbook.

**Sample**

The textbooks and curriculum programs in this study were gathered by first identifying U.S. “textbook adoption states” (Education Commission of the States [ECS], 2005). Then, the most current lists of approved curriculum materials from the 20 adoption states were reviewed, since no lists of actual adopted science curricula exist. The 12 most frequently identified science
textbooks and curriculum programs on the approved lists for 4th and 5th grades were collected and analyzed (see Table 1). These grades were selected since children are in the concrete operational stage of development where they begin using logic and reasoning to understand multiple parts of problems and systems (Piaget, 1983), which is important when beginning to understand agriculture’s many connections to science, environmental education, and other fields of study, so these grades were appropriate. The materials included in the study were published between 2003 and 2007; and while some materials have more current editions available, states often keep materials in schools up to 10 years since curriculum review cycles, adoption cycles, publisher contracts, and budget cycles vary (ECS, 2005). Regardless of reform initiatives encouraging science for all, many states, districts, and schools are unable to provide students with materials that can meet these needs and reduce inequalities due to the lack of resources to adopt newer materials (Hug, Krajcik, & Marx, 2005; Lynch, 2000), so using versions likely to still be in the classrooms across the country was intentional.

### Table 1

**Frequency of Most Approved Science Curricula by Textbook Adoption States**

<table>
<thead>
<tr>
<th>Publisher/Title/Copyright</th>
<th>Abbreviation</th>
<th>4th Grade</th>
<th>5th Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Houghton Mifflin Science-California (2007)</td>
<td>HMS</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Scott Foresman Science (2006)</td>
<td>SFS</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Full Option Science System (2005)</td>
<td>FOS</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Delta Science Modules (2004)</td>
<td>DSM</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>


*Grade four: Food Chains and Webs, Electromagnetism, Earth Movements, and Dinosaurs and Fossils. Grade five: Cells and Classification, Energy, Erosion, and Our Solar System and Beyond.

### Design and Procedure

*A Guide to Food and Fiber Systems Literacy* (henceforth, *FFSL*; Leising et al., 1998) and the *Framework* (NRC, 2012) laid the foundation for the construction of a code-sheet containing agricultural topics, themes, and concepts loosely framed around Frick and colleague’s (1991) “11 broad agricultural subject areas” (p. 54). The *FFSL* was developed and tested to provide a framework for agricultural literacy in K-12 education; however, no update has been released since its inception. Therefore, additional concepts were added to align to new agricultural topics included in the *Framework*. Ten overarching agricultural categories and 385 subsequent concepts were listed on the code-sheet, and a codebook was designed as a guide for coding the concepts (visit [https://www.academia.edu/6817113/Science_Curricula_Codebook](https://www.academia.edu/6817113/Science_Curricula_Codebook) for a downloadable version). See Table 2 for select examples in each category of the code-sheet or visit [https://www.academia.edu/6817188/Science_Curricula_Code_Sheet](https://www.academia.edu/6817188/Science_Curricula_Code_Sheet) for the complete, downloadable code-sheet. Thoughtful *a priori* research design involving coding definitions and decisions is said to improve the reliability, validity, generalizability, and intersubjectivity of the constructs identified in science reform initiatives (Neuendorf, 2002).
Table 2

*Categories with Concept Examples*

<table>
<thead>
<tr>
<th>Agricultural Category</th>
<th>Number in Category</th>
<th>Select Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Agriculture</td>
<td>46</td>
<td>Agriculture; by-products; consumers; farmer; policy; wildlife</td>
</tr>
<tr>
<td>Food &amp; Nutrition</td>
<td>48</td>
<td>Calories; diet; food; food chains; minerals; nutrition</td>
</tr>
<tr>
<td>Plants, Agronomy, &amp; Horticulture</td>
<td>51</td>
<td>Bacteria; CO₂; crops; fertilizers; irrigation; plants</td>
</tr>
<tr>
<td>Livestock, Meat, &amp; Poultry</td>
<td>31</td>
<td>Animals; birds; fish; livestock; migration; veterinarian</td>
</tr>
<tr>
<td>Dairy</td>
<td>23</td>
<td>Cheese; cows; dairy products; homogenization; pasteurization</td>
</tr>
<tr>
<td>Work Animals &amp; Machines</td>
<td>19</td>
<td>Farm machinery; ox/oxen; plow; simple machines; tools; tractor</td>
</tr>
<tr>
<td>Fiber</td>
<td>22</td>
<td>Building structures; fiber; paper; shelter; timber/lumber; wool</td>
</tr>
<tr>
<td>Land &amp; Natural Resources</td>
<td>48</td>
<td>Habitat; land/landforms; lakes/ponds; natural resources; erosion; water</td>
</tr>
<tr>
<td>Environment &amp; Sustainability</td>
<td>47</td>
<td>Climate; conservation; ecosystem; energy; pollution; sustainable</td>
</tr>
<tr>
<td>Agriscience &amp; Biotechnology</td>
<td>50</td>
<td>Agribusiness; biodiversity; biofuels; disease; pesticide; recycling</td>
</tr>
<tr>
<td>Summary</td>
<td>385</td>
<td></td>
</tr>
</tbody>
</table>

The codebook and code-sheets were used to determine the frequency and contexts in which agricultural literacy concepts were embedded in the curricula materials. Each time a concept appeared on a page in the materials, it was entered on the code-sheet. If a concept appeared more than once on a page, it was recorded only once unless it appeared in more than one context (for example, as knowledge and a skill), then each context was recorded individually. Tables-of-contents, glossaries, vocabulary insets, overviews/reviews, and supplemental references were not included in the analysis. Illustrations of a concept, such as dog (animal) or kudzu (plant), were coded as the concept they represented. If similar illustrations appeared on the same page, such as wolf and dog, animal was counted only once. Concepts were then tallied to describe the frequency of each category’s representation.

The materials were also reviewed to examine the context in which agricultural concepts were presented to either: 1) provide content knowledge, 2) teach a related skill, or 3) influence an attitude or change a belief. The definitions of KSABs were adapted from Bloom’s taxonomy of learning domains and defined in the codebook using examples from the Association of Schools of Public Health’s (2012) guiding documents for faculty and curriculum designers (see Table 3 below for select examples). These documents provided action verbs and examples to identify knowledge (usually as background content), skills (in labs/guided inquiries or critical thinking questions), and attitudes/beliefs (suggestions for altering opinions or behaviors) in the study.
Table 3
Select Definitions, Action Verbs, and Examples from NGSS of KSABs from the Codebook

<table>
<thead>
<tr>
<th>Definitions</th>
<th>Knowledge</th>
<th>Skills</th>
<th>Attitudes/Beliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>complex process of learning concepts, principles, and information, and remembering, relating, and judging ideas or abstract phenomenon</td>
<td>the ability to use one's knowledge effectively and readily in execution or performance; a learned power of doing something competently: a developed aptitude or ability</td>
<td>conviction of the truth of some statement or the reality of some being or phenomenon especially when based on examination of evidence</td>
<td></td>
</tr>
</tbody>
</table>

| Action Verbs                                                                 |                                                                                                                                                                                                 |
| analyze, classify, compare, describe, differentiate, explain, generate, identify, interpret, justify, prioritize, recognize, summarize, understand, use, verify | adapt, assess, categorize, clarify, communicate, construct, cooperate, demonstrate, detect, develop, document, employ, evaluate, organize, prioritize, propose, recommend, utilize | appreciate, assume responsibility, assure, be conscientious, be ethical, demonstrate composure, develop, endorse, express, justify, maintain awareness, resolve, respect, value |

| NGSS Examples                                                                 |                                                                                                                                                                                                 |
| Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. | Obtain and combine information about ways individual communities can use science ideas to protect the Earth’s resources and environment. | Individuals and communities are doing things to help protect Earth’s resources and environments. |

Upon completion, the data from the code-sheets were analyzed to address both research questions. Frequencies of each concept and the contexts of agricultural literacy in each science curriculum were computed. To ensure inter-rater reliability, an undergraduate student coder also examined one textbook and curriculum program from each grade level, for a total of four sources. Coding agreement occurred for the majority of items (91%), and when disagreements occurred, discussions took place until consensus was reached.

Findings

Table 4 contains a list of the frequencies that the agricultural categories appeared, and Table 5 showcases the distribution of the categories’ contexts. None of the materials included all 385 subsequent concepts from the 10 created categories. On average, the materials contained between 19% (general agriculture) and 60% (plants, agronomy, and horticulture) of the subsequent concepts in each category. Equally notable, not all of the concepts were presented as knowledge, skills, and attitudes/beliefs.

Frequencies of Agricultural Representation

The number of page occurrences for each concept was analyzed to determine the frequencies agricultural categories appeared in the materials (see Table 4). Land and natural resources (N=5,703), plants, agronomy, and horticulture (N=4,677), and environment and sustainability (N=3,521) appeared regularly in all materials; however, some concepts appeared substantially more often than others, which resulted in a higher frequencies of certain categories. For instance, in the land and natural resources category, many materials cited water’s (N=1,746)
importance as a natural resource, but did not include concepts such as overgrazing and deforestation. Similarly, in the plants, agronomy, and horticulture category, plants (N=1,025) appeared frequently as part of the food chain, ecosystem, or whose structures and functions were described and analyzed; however, concepts such as agronomy and cultivation were seldom mentioned. In the environment and sustainability category, energy (N=672) was mentioned frequently in the materials; however, concepts related to stewardship, climate change, and sustainability rarely appeared.

Food and nutrition (N=2,113), livestock, meat, and poultry (N=2,081), fiber (N=1,028), and agriscience and biotechnology (N=884) were moderately represented in the materials; and again, some concepts were mentioned more often than others. All used the term food (N=619) regularly; however, concepts such as calories, hunger/starvation, and preservatives rarely appeared. The livestock, meat, and poultry category appeared regularly simply because it contained the term animal (N=1,120), which seldom related to agriculture.

General agriculture (N=466), work animals and machines (N=152), and dairy (N=168) were not mentioned significantly in any of the materials. Several used horses to describe fossils, bones, and evolution, but offered little more about their agricultural uses, save for one discussing crossbreeding and hybrids (both in agriscience and biotechnology). Other materials offered lessons on simple machines, demonstrating their mechanics and physics rather than their importance in agricultural production. Dairy concepts appeared most often when illustrating digestion.

While many agricultural concepts appeared in the materials, many concepts were often disconnected from the agricultural literacy standards defined in FFSL and the Framework. Conceptual ideas pertaining to particular agricultural concepts were not developed. Topics were primarily presented as isolated facts or examples illustrating separate, non-agricultural ideas in science education.
### Table 4

*Frequencies of Agricultural Literacy Concepts in Upper-Elementary Science Curricula*

<table>
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<tr>
<th>Agricultural Category</th>
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<tr>
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</table>

*Knowledge, Skills, or Attitudes/Beliefs:…*
Agricultural Contexts

The contexts in which agricultural concepts appeared were not distributed evenly across KSABs (see Table 5). As mentioned, none of the materials included all of the concepts represented as knowledge, skills, and attitudes/beliefs; however, some materials did present a few concepts in all contexts (KSABs). For instance, one text discussed farming’s future and hydroponics in great detail, offering facts (knowledge), questions for inquiry (skills), and the thought that such growing may be healthier and more environmentally friendly than traditional agricultural practices that produce runoff and pollution from pesticides and herbicides (attitudes/beliefs). A few described plants and their uses (knowledge), used them in labs to teach scientific processes (skills), and discussed how protecting them would reduce soil erosion, carbon dioxide, and promote healthy ecosystems to encourage students to be more conscientious about their impacts on the environment (attitudes/beliefs).

Most agricultural concepts, however, were presented as content knowledge (N=16,710) to illustrate non-agricultural topics, rather than teach related skills (N=3,255) or influence attitudes/beliefs (N=828). For example, a passage highlighting a chemist who studied fuel cells mentioned ethanol (a biofuel made from corn) as renewable energy; however, the occupation was the focus, not the processes involved (skill) or importance of developing biofuels for commercial use to conserve natural resources (attitude/belief). Another mentioned land clearing and plowing as human environmental manipulations that cause habitat and ecosystem destruction, which could generate negative attitudes about agriculture, but failed to mention agriculture’s importance to the survival of the global population.

When concepts were used to teach skills, most used labs, demonstrations, or critical thinking questions involving animals, plants, fruits or vegetables, soil, water, sunlight, or insects to investigate plant parts or growth, composting, environments, ecosystems, or pollution. For example, onions were used in labs to teach students how to classify plant parts and view cells; however, not all labs were meaningfully tied back to knowledge of growing plants or plants’ importance for survival and for reducing carbon dioxide. Soil was used in labs to encourage investigation about erosion, soil composition, and filtering water, but offered minimal suggestions for student action to conserve and protect it as a natural resource.

When concepts were presented to influence attitudes or beliefs, most materials described pollution, conservation, and ecosystem, habitat, and environmental destruction. Students learned through vignettes that chemicals, fertilizers, and pesticides caused water, soil, and air pollution, what individuals were doing to combat it, and what students could do to change their behaviors or help repair the environment. One textbook described a man who removed garbage along the Mississippi River because pollution and toxic runoff contaminate drinking water and encouraged students to find ways to help keep their own rivers clean. Another’s passage offered suggestions for students to participate in Earth Day, but provided little background knowledge or further inquiry. Overall, these findings demonstrate a lack of agricultural literacy concepts and an uneven distribution of the concepts over the contexts of KSABs.
Table 5

**Contexts of Agricultural Literacy Concepts in Upper-Elementary Science Curricula**

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Table 5 (continued)

**Contexts of Agricultural Literacy Concepts in Upper-Elementary Science Curricula**

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Discussion

This analysis revealed a lack of agricultural concepts in the widely adopted upper-elementary science curricula that were reviewed. The materials did not include thorough representation of agricultural literacy concepts or a wide distribution of KSABs. Most concepts were presented to promote knowledge acquisition of non-agricultural topics, rather than teach transferable skills or alter attitudes/beliefs related to agricultural literacy and environmental conscientiousness, thus not providing students with a comprehensive understanding of agricultural literacy. Assuming science curricula would present concepts primarily to provide content knowledge, also using agriculture to teach skills and address attitudes/beliefs would create comprehensive materials that support recent reform initiatives’ hopes of producing knowledgeable, inquisitive, and conscientious students. Within the texts and curriculum programs, few terms rose to any level of emphasis (e.g., *water, plants, animals*); however, their agricultural importance rarely emerged. Also, agricultural KSABs were found more in fifth grade materials than fourth, providing younger students with less exposure to agriculture when their logic and reasoning skills may be more developmental. Regardless of agriculture’s presence in national science and environmental education reform initiatives, it was not presented coherently in the science materials reviewed here.

New frameworks and standards (NRC, 2012; NGSS Lead States, 2013) are guiding decision makers and educational policy toward curriculum redesign; and this study reaffirms the critical need for curriculum reform with the systematic reintegration of agriculture, where agriculture can be integrated coherently into general education materials to serve as the keystone to minimizing the breadth of disjointed facts and increasing the depth of understanding through crosscutting concepts, practices, and core ideas shared by multiple fields (NRC, 2012). Identifying the frequency and contexts in which agricultural concepts appear in current materials can provide support and evidence for policy makers and stakeholders looking to further conversations about curriculum integration in science, environmental education, and ESD around relevant and authentic topics. Agriculture can become the unifying topic, as its presence is noted in each of the reform initiatives’ guiding documents. Agricultural literacy can help students connect KSABs in science, environmental education, and ESD; and returning to agriculture’s historic scientific foundation through integrated curriculum can increase literacy in these fields. While these subjects are generally taught in isolation with minimal integration, integrating agriculture can link them by providing relevant, authentic, and familiar examples and connections students recognize by acknowledging the resources and products people consume involve scientific processes with environmental impacts. Therefore, we contend that the next generation of basal science textbooks and curriculum programs should include agriculture as an integrating theme in the curriculum.

Recommendations for Future Research

As curriculum reform initiatives call for integrated materials, increased student literacy, science for all, and the leveling of inequality in general education, this study demonstrates a place to begin further research into the “how” after identifying “where” the lack of agricultural representation is. Curriculum and instructional designers can begin to locate appropriate places for agricultural integration into new basal textbooks and curricular programs, and developers can then redesign integrated curriculum that promotes agricultural literacy that could be adopted by states and districts. Similarly, if developing integrated curricula is the goal, studies such as this one should be replicated to determine the frequency and contexts of agricultural concepts in other subjects’ basal textbooks and curriculum programs outside of science. The following are our recommendations for developing more coherent, integrated curricula.

First, comprehensive agricultural literacy curriculum should be developed that align to the *FFSL* (Leising et al., 1998), the *Framework* (NRC, 2012), *NGSS* (NGSS Lead States, 2013),
National Agricultural Literacy Outcomes (henceforth, NALO; Spielmaker, 2013), and Common Core Standards (National Governors Association Center for Best Practices [NGACBP], 2010). However, agricultural curriculum materials should not be predominantly supplemental or curriculum enhancement materials, but systematically integrated with existing subject concepts (Shepardson, Niyogi, Choi, & Charusombat, 2009). Appropriate design should allow agricultural literacy topics to fit coherently into the adopted general education curriculum. Analysis of existing materials’ tables-of-contents should be done to determine appropriate places for such inclusion.

Based on the findings from this study, we recommend that upper-elementary curriculum include a sequence of agricultural literacy topics derived from FFSL (Leising et al., 1998), NALO (Spielmaker, 2013), and the Framework (NRC, 2012). Curriculum and instructional designers should use agriculture as a unifying topic for science, environmental education, and ESD to encourage literacy through the development of KSABs embedded in crosscutting concepts, core ideas, and practices found in all the subjects. Students can learn about the processes foods and fibers pass through before reaching consumers. These processes can be connected to science lessons on ecosystems, living things, weather, and the human body, providing a basis for understanding the need for global trade, producing certain products in certain places, and how to make healthy lifestyle choices. By studying agricultural systems in detail, students can distinguish between sustainable practices and the environmental impacts of irresponsible practices, and eventually come to appreciate their responsibilities as informed citizens by participating in discussions and decisions regarding public policy.

Secondly, agricultural literacy assessments should align to frameworks and standards and measure science and environmental literacy through multiple approaches and instruments (NRC, 2014). Providing several methods of summative and formative assessment, checks-for-understanding, and authentic performance tasks incorporating agricultural literacy KSABs will help students gain scientific knowledge and skills, learn to question and investigate environmental issues, and plan for a sustainable future (Wiggins & McTighe, 2005).

Finally, in order to implement new curricula, teacher professional development should be designed to integrate agricultural KSABs as an important component of teachers’ pedagogical content knowledge (Balschweid et al., 2000). The inclusion of authentic agricultural experiences would also address stereotypes and misconceptions and improve educators’ agricultural literacy as well.

Limitations

There were some limitations with this study that involved material selection. While the sampling procedure included materials approved by adoption states, it did not include all basal textbooks or curriculum programs available to teachers and districts. While it is safe to assume many non-adoption states use these materials, curricula not included in this study may have resulted in higher agricultural content frequencies. Additionally, materials that did not appear on approval lists may be more widely used by schools in non-adoption states. Furthermore, some programs used in this study have more recent editions available for schools. These newer editions may have already been revised to include additional agriculture concepts.

Additionally, this study only looked at science basal textbooks and curriculum programs. Agricultural literacy KSABs may be presented in other subject areas’ materials in a more thorough and integrated fashion. Similarly, analyzing materials from more grades than 4th and 5th may have produced more comprehensive results. Further research can improve and expand upon the findings mentioned here.
Conclusion

Identifying the need for revised curricula that align to current standards from NGSS (NGSS Lead States, 2013) and Common Core Standards (NGACBP, 2010) to promote agricultural literacy is timely. Even though studies have found that teachers had favorable impressions of agriculture, recognized it would enhance their curriculum, and believed agriculture could be integrated into any subject (Knobloch & Martin, 2002), it is still not present in classrooms (Bellah & Dyer, 2009; Leising et al., 2003) and materials. Agricultural literacy instructional resources are available, but teachers’ lack of knowledge or interest, their stereotypes, or their lack of time due to “over-stuffed” curriculum and high-stakes testing may drive their decisions to not include agriculture in their classes (McReynolds, 1985).

In the development of the next generation of U.S. science curriculum, it is important that curriculum developers design programs to incorporate agriculture in a coherent, systematic fashion, rather than leaving it to vocational study alone. We encourage agricultural and environmental experts to work with science curriculum developers to address the deficiencies found in this study to build a more agriculturally integrated curriculum. Future research might include investigation into other discipline-based fields to support these findings regarding agriculture’s absence in elementary curricula; however, science seems the most likely place to begin agriculture’s reintegration into general education.

References


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Exploring the Relationship between Critical Thinking Style and Water Conservation Behavior: Implications for Extension

Courtney T. Owens¹ and Alexa J. Lamm²

Abstract

In the past several years Cooperative Extension has focused on developing educational programs that address water conservation, specifically for individuals using exorbitant amounts of water, with limited success. However, few research studies have examined how the way people think, including their critical thinking styles, can be used to inform extension program development. The purpose of this study was to address this gap in the literature by examining how people who use a lot of water think critically and whether their critical thinking style influenced their engagement in water conservation (or lack thereof). Responses were obtained from 932 Florida residents identified as high water users via an online survey. The findings revealed respondents engaged in a low level of landscape water conservation behaviors. The results also showed relationships did exist between critical thinking style and level of engagement in landscape water conservation behaviors implying critical thinking styles should be considered when developing extension programs in this area. Recommendations include using critical thinking style to tailor programs that bring educational awareness of landscape water conservation to high water users.

Keywords: critical thinking style; water conservation; Cooperative Extension; high water users; landscape

Introduction

Current water supplies are being depleted at a rapid rate with a world population that continues to increase requiring more water consumption (Delorme, Hagan, & Stout, 2010; Lamm, Lamm, & Carter, 2015; Vörösmarty, Green, Salisbury, & Lammers, 2000). In the United States alone, the average household consumes approximately 32 gallons of water per day (United States Environmental Protection Agency, 2013) and that rate is increasing. For example, in 2030 Florida’s demand for fresh water is expected to increase by 28% when compared to the state’s water demand in 2005 (United States Environmental Protection Agency, 2013). If widespread water conservation action is not taken, water shortages will impact future residential water use (Olmstead & Stavins, 2009).

Cooperative Extension has focused on developing educational programs that address major water issues over the past several years (Terlizzi, 2006; Welch & Braunworth, 2010) in order to alert citizens about the dangers of future water shortages. Targeting extension programming focused on changing water consumption behaviors to groups of individuals that consume an unusually large amount of water, when compared to the general public, could offer the largest return on investment (Huang & Lamm, 2015b; Monaghan, Warner, Telg, & Irani, 2014).

Obtaining information about the way the public engages in water conservation can be useful to extension educators as they strive to encourage behavior change (Suero & Rosenberg, 2009).

¹ Courtney T. Owens is an Assistant Extension Administrator/ State Specialist in Program and Staff Development, Kentucky State University, coterrell74@gmail.com.
² Alexa J. Lamm is an assistant professor in the Department of Agricultural Education and Communication and the associate director of the UF/IFAS Center for Public Issues Education in Agriculture and Natural Resources, University of Florida, PO Box 112060, Gainesville, FL, 32611, alamm@ufl.edu.
2010; Warner, Rumble, Martin, Lamm, & Cantrell, 2015). Research has shown when people gain more knowledge they will develop more positive attitudes ultimately adopting new practices that fit in with their current schema (Abu-Taleb & Murad, 1999). Therefore, as the public gains information about future water shortages, there is a better likelihood they will take action to conserve water (Jorgensen, Graymore & O’Toole, 2009; Leal, Rumble, & Lamm, 2015). Engagement in water conservation practices includes the adoption of water-saving technologies such as low-flow faucets, showerheads, and dishwashers that assist in eliminating water waste (Suero & Rosenberg, 2010) as well as engaging in proper water use in home landscapes.

A specific group of water users, labeled as high water users in the literature, consumes more than the average citizen due to their landscaping needs and preferences (Huang, Lamm, & Dukes, 2016). Recognizing this is a high impact audience, extension educators have targeted this population by examining current water usage data available from local utility companies and collected needs assessment data (Monaghan et al., 2014). Research on attitudes, demographics, lifestyles, and current behaviors have also been used to identify this audience needs with some success (Huang & Lamm, 2015a; Leal et al., 2015; Monaghan, Ott, Wilbur, Gouldthorpe, & Racevks, 2013). When addressing water conservation specifically, research has shown extension educators need to understand that certain groups of water users have different attitudes towards conservation and, therefore, have different educational needs (Ott, Monaghan, Israel, Gouldthorpe, & Wilbur, 2015). In addition, research has shown that some audiences adopt behaviors more easily than others (Loibl, Diekmann, & Batte, 2010). This may be due to individual cognitive traits, such as critical thinking styles (Gorham, Lamm, & Rumble, 2014).

Even though critical thinking styles are known to impact how individuals process information and deal with critical issues (Blackburn, Robinson, & Lamm, 2014), very little research has examined how critical thinking styles can be used to inform extension program development (Gay, Terry, & Lamm, 2015). Critical thinking style “explains how an individual prefers one particular method to another when processing information, or critically thinking about a particular topic” (Gorham et al., 2014, p. 44). Critical thinking styles can vary between engagement and seeking information tendencies and provide guidance on how people approach and process information (Lamm, 2015b). During the initial planning stages for new programs, extension educators should align with their client’s needs (Owens, Warner, Rumble, Lamm, Martin, & Cantrell, 2015). As such, having knowledge of their client’s critical thinking styles may assist in the development of experiences that will appeal to a specific audience. This research directly aligns with the American Association for Agricultural Education National Research’s Priority Area One which discusses the importance of enhancing “the public and policymakers with accurate information about agriculture and natural resource concepts” (Enns, Martin, & Spielmaker, 2016, p.14) because it seeks to identify best methods for delivering landscape water conservation extension programs to an important segment of the public that is overusing one of the world’s most valuable resources, water.

### Conceptual Framework

The conceptual framework for this study was based on the concept of critical thinking style identified by Lamm and Irani (2011). According to Facione (1990), critical thinking is defined as “... purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as an explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based” (p. 2). Facione (1990) mentioned critical thinkers are “... well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, [and] diligent in seeking relevant information ...”
Lamm and Irani (2011) suggested each critical thinker has an individual style of thinking about a topic that resonates with each specific issue, such as the need to conserve water. Critical thinking style is a preference a process thinker goes through when reaching a solution to a problem (Lamm, 2015a). Critical thinking style also represents the formalized way an individual converses through their thought process and ultimately reaches a final decision (Irani, 2006). Lamm and Irani (2011) indicated there is not a correct or incorrect way to reason critically but rather introduced the idea that people process information differently and, therefore, go through the critical thinking process in a variety of ways. According to Lamm and Irani (2011), an individual’s critical thinking style can be placed on a continuum between engagement and seeking information.

Individuals with a seeking information style or seekers are interested in seeking out large amounts of information and are concerned with knowing there was enough time to actively consider all possibilities (Lamm & Irani, 2011). Seekers are hungry learners, eager to process and consume a large amount of information. They also recognize that most situations or problems are multifaceted, and no straightforward answer is likely to be found when trying to solve problems (Lamm & Irani, 2011). In a study examining Florida residents’ water conservation practices in general, Gorham et al. (2014) found seekers preferred to gain information about water conservation by searching through media sources themselves.

Individuals with an engagement critical thinking style or engagers are highly engaged with their surroundings, and therefore, are likely to predict problems that will require critical thinking before they happen (Lamm & Irani, 2011). Engagers also look for opportunities to employ their reasoning skills and are assertive when presented with a problem to solve. They prefer to engage with others’ in discussions because they appreciate others’ opinions, but are also confident in discussing their own reasoning process and how they arrived at their solutions (Lamm & Irani, 2011). Research has shown engagers prefer to learn about water conservation through their environment, which involves more traditional face-to-face contact (Gorham et al., 2014).

Critical thinking style can be used to tailor programs to reach individuals’ styles with suitable educational experiences that activate their natural tendencies (Gorham et al., 2014). Developing a stronger awareness of the need for water conservation is a purposeful effort that is a constant challenge requiring a strong commitment (Sindik & Araya, 2013). Understanding how high water users think critically and how their critical thinking styles relate to their engagement in water conservation practices could inform the development of extension programs that are more effective because such are targeted to the population of interest.

Purpose and Objectives

The purpose of this study was to determine how critical thinking style related to engagement in water conservation practices to offer insight into how extension educators can develop extension programs targeted at specific critical thinking styles. The following research objectives guided the study:

1. Describe respondents’ level of engagement in landscape water conservation behaviors;
2. Describe respondents’ critical thinking styles; and
3. Identify the relationship between respondents’ levels of engagement in landscape water conservation behaviors and their critical thinking styles.
Methods

An online questionnaire was administered to Florida residents to identify the relationship between critical thinking style and levels of engagement in landscape water conservation behaviors. The population of interest was high water users in Florida. High water users in Florida were chosen because water is among Florida’s most cherished resources, and population growth is putting an ever-increasing amount of pressure on a limited water supply (Barnett, 2007; Marella, 2008).

A panel of experts with a background in water conservation, public opinion research, and survey design was used to review the entire instrument for face and content validity. These individuals were selected based on their content and survey construction knowledge. The panel of experts included the director of the UF/IFAS Center for Landscape Conservation and Ecology, the director of the UF/IFAS Center for Public Issues Education in Agriculture and Natural Resources (PIE Center), and a professor with a specialty in questionnaire design.

This research was part of a larger study. Respondents were presented with a 132-item online instrument; however, only two sets of questions were germane to this study. The first set of questions were adapted from Patterson’s (2012) RBC Canadian Water Attitudes Study to measure respondents’ level of engagement in landscape water conservation behaviors. Respondents were offered seven items to choose from that referenced landscape water conservation behaviors. Respondents were then asked to use a scale to select from two options either yes I engage or no I do not engage in this landscape water conservation behavior. If a respondent indicated they did engage in a practice, they were given a point. The total number of points were summed to create an overall behavior score, that could have ranged from zero to seven, used in further data analysis.

The second set of questions consisted of the University of Florida Critical Thinking Inventory or UFCTI (Lamm & Irani, 2011). The UFCTI identifies how an individual prefers to gather information about a topic by providing a score that distinguishes between individuals with a seeking information critical thinking style (seekers) and those with an engagement critical thinking style (engagers). The UFCTI consists of 20 items. The respondents were requested to indicate their level of agreement or disagreement with each statement on a five-point Likert-type scale ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree. Thirteen of the items are designated as seeking-type questions and seven as engager questions. The responses from the 13 seeker items were summed to create a seeker score. The responses from the seven engager items were summed to create an engager score. To create the overall UFCTI score, the responses to the engager items were reverse coded, summed, and multiplied by 1.866. The overall seeker and reverse coded engager score were then calculated to create an overall UFCTI score. Respondents with a score of 79 or higher were identified as seekers and those with a 78.99 or lower were identified as engagers (Lamm & Irani, 2011). In addition, a priori reliability of the overall UFCTI was a Cronbach’s α of .95. The engager construct had a Cronbach’s α of .89, and the seeker construct had a Cronbach’s of .92. Finally, respondents were asked to identify their sex, race, ethnicity, age, residential zip code, and political affiliation.

A non-probability opt-in sampling technique was used to obtain the eligible participants. Non-probability sampling methods strive to represent the population of interest, in this case, high water users, therefore, participation rates were used rather than response rates (Baker et al., 2013). A total of 3,494 Florida residents were asked to participate in the study. However, a resident only qualified as a high water user and allowed to complete the survey if they met certain criteria that included being 18 years of age or older, living in specific counties identified as using high amounts of water in the state of Florida, having an annual household income greater than $50,000, having an irrigated landscape, and hiring an outside company to maintain that landscape (Davis & Dukes, 2014). Participants were gradually invited to participate in the study until specific quotas were filled (Baker et al., 2013). A participation rate of 26.7% (N = 932) was obtained based on those who...
qualified and completed the survey. Quotas were set *a priori* to recognize targeted respondents; therefore, the data was not weighted.

The data were analyzed with descriptive and correlational statistics with Statistical Package for the Social Sciences® 21.0. A significance level of $p \leq .05$ was established *a priori*. To examine the shared characteristics between respondents' levels of engagement in water conservation behaviors and critical thinking style scores, a relationship coefficient ($r$) was used (Kotrlik, Williams, & Jaber, 2011). It was also used to measure the effect size between the two parameters. The coefficients were interpreted using Davis' (1971) correlational strengths with .01 to .09 indicating a negligible relationship, a .10 to .29 indicating a low level relationship, a .30 to .49 indicating a moderate relationship, a .50 to .69 indicating a substantial relationship, and a score greater than .70 indicating a very strong relationship.

**Results**

**Demographics**

Detailed demographics of high water user respondents in the state of Florida are displayed in Table 1. Descriptive analysis showed there was a fairly even gender split within the respondents. The majority of respondents were Caucasian/White (Non–Hispanic) followed by Hispanics. More than 65% of the respondents had at least a four-year college degree and an annual family income of more than $75,000 a year. Although all political affiliations were represented, the largest group indicated they were Republican (37.1%).
Table 1

Demographics \((N = 932)\)

<table>
<thead>
<tr>
<th></th>
<th>(n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>484</td>
<td>51.9</td>
</tr>
<tr>
<td>Male</td>
<td>448</td>
<td>48.1</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>41</td>
<td>4.4</td>
</tr>
<tr>
<td>Asian</td>
<td>14</td>
<td>1.5</td>
</tr>
<tr>
<td>Caucasian/White</td>
<td>871</td>
<td>93.5</td>
</tr>
<tr>
<td>Hispanic</td>
<td>63</td>
<td>6.8</td>
</tr>
<tr>
<td>Native American</td>
<td>5</td>
<td>.5</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 - 29</td>
<td>21</td>
<td>2.3</td>
</tr>
<tr>
<td>30 - 39</td>
<td>92</td>
<td>9.9</td>
</tr>
<tr>
<td>40 - 49</td>
<td>108</td>
<td>11.6</td>
</tr>
<tr>
<td>50 - 59</td>
<td>188</td>
<td>20.2</td>
</tr>
<tr>
<td>60 - 69</td>
<td>313</td>
<td>33.6</td>
</tr>
<tr>
<td>70 - 79</td>
<td>188</td>
<td>20.2</td>
</tr>
<tr>
<td>80 years and older</td>
<td>22</td>
<td>2.4</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not obtain a high school diploma</td>
<td>1</td>
<td>.1</td>
</tr>
<tr>
<td>High school diploma</td>
<td>55</td>
<td>5.9</td>
</tr>
<tr>
<td>Some college education</td>
<td>153</td>
<td>16.4</td>
</tr>
<tr>
<td>2 year college degree</td>
<td>94</td>
<td>10.1</td>
</tr>
<tr>
<td>4 year college degree</td>
<td>355</td>
<td>38.1</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>274</td>
<td>29.4</td>
</tr>
<tr>
<td><strong>Annual Household Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$50,000 to $74,999</td>
<td>244</td>
<td>26.2</td>
</tr>
<tr>
<td>$75,000 to $149,999</td>
<td>461</td>
<td>49.5</td>
</tr>
<tr>
<td>$150,000 to $249,999</td>
<td>167</td>
<td>17.9</td>
</tr>
<tr>
<td>$250,000 or more</td>
<td>60</td>
<td>6.4</td>
</tr>
<tr>
<td><strong>Political Affiliation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Democrat</td>
<td>281</td>
<td>30.2</td>
</tr>
<tr>
<td>Republican</td>
<td>346</td>
<td>37.1</td>
</tr>
<tr>
<td>Independent</td>
<td>211</td>
<td>22.6</td>
</tr>
<tr>
<td>Non Affiliated</td>
<td>84</td>
<td>9.0</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
<td>1.1</td>
</tr>
</tbody>
</table>

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Level of Engagement in Landscape Water Conservation Behaviors

Respondents were asked to indicate the landscape water conservation behaviors they engaged in by marking whether or not they engaged in seven behaviors (see Table 2). The behavior in which respondents reported being most engaged in the most was installing a smart irrigation controller ($f = 428, 51.9\%$). Respondents also indicated they used low water consuming plant materials in their yards to help conserve water ($f = 395, 51.2\%$). In addition, almost half of the respondents had installed high efficiency sprinklers.

Table 2

*Landscape Water Conservation Behavior Engagement (N = 932)*

<table>
<thead>
<tr>
<th>Behaviors</th>
<th>$f$</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I use a smart irrigation controller.</td>
<td>428</td>
<td>51.9</td>
</tr>
<tr>
<td>I have low-water consuming plant materials in my yard.</td>
<td>395</td>
<td>51.2</td>
</tr>
<tr>
<td>I use high efficiency sprinklers.</td>
<td>361</td>
<td>48.5</td>
</tr>
<tr>
<td>I used recycled wastewater to irrigate my lawn landscape.</td>
<td>210</td>
<td>22.5</td>
</tr>
<tr>
<td>I have retrofitted a portion of my landscape so that it is not irrigated.</td>
<td>162</td>
<td>18.6</td>
</tr>
<tr>
<td>I use drip micro irrigation.</td>
<td>109</td>
<td>13.2</td>
</tr>
<tr>
<td>I used rain barrels to collect water for use in my garden/lawn.</td>
<td>72</td>
<td>7.8</td>
</tr>
</tbody>
</table>

For each landscape water conservation item a respondent reported engaging in, they were assigned a point. The points were then summed to create an overall score. The total landscape water conservation scores could have ranged from zero to seven. Upon analysis, the mean landscape water conservation behavior engagement score was a $2.15$ ($SD = 1.51$) indicating a low overall level of engagement in landscape water conservation behaviors.

Critical Thinking Styles

Critical thinking styles were examined by using the UFCTI. On the UFCTI a respondent can score between a 26 and a 130 with a score of 79 or above designating a respondent as a seeker and a score of 78.99 or lower designating a respondent as an engager. The overall critical thinking style scores of the respondents ranged from 65.17 to 103.67, with a mean score of $77.79$ ($SD = 3.87$) indicating the respondents tended toward being engagers (see Table 3).

Table 3

*Respondents’ Critical Thinking Styles (N = 932)*

<table>
<thead>
<tr>
<th></th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall UFCTI Score</td>
<td>77.79</td>
<td>3.87</td>
</tr>
<tr>
<td>Seeker Score</td>
<td>52.60</td>
<td>5.92</td>
</tr>
<tr>
<td>Engager Score</td>
<td>28.26</td>
<td>3.57</td>
</tr>
</tbody>
</table>
Relationships between Engagement in Landscape Water Conservation Behaviors and Critical Thinking Styles

Respondents’ levels of engagement in landscape water conservation behaviors and their overall critical thinking style scores were analyzed using correlations to determine if relationships existed (see Table 4). Davis’ (1971) description of correlational strengths was used to identify magnitude. UFCTI score was found to be negatively correlated with the respondents’ level of engagement in landscape water conservation behaviors ($r = -0.08, p = 0.02$). Therefore, the lower the UFCTI score (the less likely to seek information when thinking critically), the less likely the individual was to engage in landscape water conservation behaviors. While this relationship was significant, it was also negligible in terms of strength.

Relationships between seeking information and engagement scores with landscape water conservation behaviors were also examined. The seeking information score had a positive significant relationship with engagement in landscape water conservation behaviors ($r = 0.15, p < 0.01$). This result indicated that, while a low association, the more someone has a preference for seeking information when thinking critically, the more likely they are to engage in landscape water conservation behaviors. The engager score had a significant negative correlation ($r = -0.18, p = 0.00$) with the level of engagement in landscape water conservation behaviors. This result revealed that the more respondents indicated they engaged when thinking critically, the lower the respondents’ engagement in landscape water conservation behaviors. Again, this is a low association by Davis’s (1971) convention, but is statistically significant.

Table 4

| Relationship between Landscape Water Conservation Score and Critical Thinking Style |
|---------------------------------|---------------------------------|------------------|
|                                 | $r$                             | $p$              |
| Overall UFCTI Score            | -0.08                          | 0.02*            |
| Seeker                         | 0.15                           | 0.00**           |
| Engager                        | -0.18                          | 0.00**           |

Note. *$p < 0.05$; **$p < 0.01$.

Conclusions, Implications, and Recommendations

The findings from the study revealed respondents classified as high water users in Florida engaged in a low level of landscape water conservation behaviors. These results align with similar findings from both Monaghan et al. (2013) and Huang et al. (2015), further supporting high water users should be a target audience for extension. Although the lack of engagement reiterates there is an opportunity for extension educators to engage residents that use a high amount of water in the landscape it also implies there are barriers to engagement since the work done in this area (Monoghan et al., 2014) does not seem to be having the desired effect.

The findings from this study confirm what Jorgensen et al. (2009) found, indicating that residents will take some level of responsibility towards their action pertaining to the amount of water they consume. This was evident by the respondents reporting the use of low water-consuming plant materials in their yards, and using smart irrigation controllers for their landscapes. It is important to note that “Florida is one of just a few states with a rain sensor statute” (Dukes & Haman, 2013, p. 1). This statute may have impacted the number of homes with smart irrigation controllers, rather than it being a homeowners’ choice to purchase the product for water conservation reasons.
In addition to distinguishing the level of engagement of Florida high water users in landscape water conservation behaviors, this study focused on critical thinking styles of the respondents. The overall critical thinking score determined a majority of the respondents were engagers of information. The results also revealed relationships did exist between critical thinking style and levels of engagement in landscape water conservation behaviors. The findings support previous research that identified differences in the way seekers and engagers use their information processing routes to make choices around actual engagement in behaviors (Gorham et al., 2014; Lamm & Irani, 2011). More specifically, the results indicated the higher the respondents’ seeker score (an increased tendency to seek information when thinking critically) the more likely the individual was to engage in landscape water conservation behaviors. The results also indicated the more respondents showed they engaged with others when thinking critically, the lower respondents’ level of engagement in landscape water conservation behaviors. While it is important to recognize the effect sizes were low, Steinberg (2011) points out that low associations can assist in exploring relationships.

The findings from this study showed, that as extension educators continue to educate stakeholders about the importance of landscape water conservation, it is important to understand critical thinking styles as a tool for enhancing program planning (Huang & Lamm, 2015b). More specifically, extension educators should use critical thinking style to tailor programs that bring educational awareness about landscape water conservation behaviors to high water users. Since the majority of high water users are engagers, and are less likely than their seeker counterparts to engage in water conservation behaviors, extension educators should think about how engagers consume information when developing their programs. Engagers obtain information by engaging in conversations (Lamm & Irani, 2011). This implies high water users are most likely conversing with other high water users (potentially their neighbors and friends) that are reinforcing their negative behaviors through social norms. To counteract this behavior, extension educators should get groups of neighbors and friends together to discuss the value of engaging in landscape water conservation efforts so they can proactively encourage one another and hold each other accountable. In addition, extension educators could provide programming within a neighborhood by collaborating with the homeowner’s association or being present at a local clubhouse rather than their county extension office so the program is being delivered within the established social system and may attract more high water users. Extension programs targeting engagers should include face-to-face interactions and group discussions to emphasize the social side of information-gathering and decision-making (Gorham et al., 2014).

Although not the majority, a large group of high water users were also seekers. To reach this audience, extension educators should create more distance learning materials with tutorials, interactive blogs, and fact sheets. These materials would allow seekers the ability to find the information they need to make personal decisions regarding their landscapes, and the use of water (Lamm & Irani, 2011).

Considering the low effect size of the relationship, it is important to further explore this area of inquiry. First, it is suggested the study be replicated in other states that have high water users and are dealing with larger water shortages than Florida, such as California. It would also be important to examine the impacts of statewide regulation, such as the rain sensor statute mentioned previously, to determine if governmental regulation has more impact than educational initiatives and to determine if extension educators should be partnering with those regulating water use. Lastly, it would be good practice to develop programs with engagers and seekers in mind and then create an experimental design, introducing the different approaches to individuals with both critical thinking styles, to see if behavior changes are more evident in programs directly focused on reaching participants through their critical thinking styles.
References


Bryan D. Rank¹ and Michael S. Retallick²

Abstract

In the 1990s, a series of research syntheses were conducted regarding supervised agricultural experience. These syntheses included supervised agricultural experience (SAE) research from 1964 through 1993. With these past syntheses as the premise, contemporary SAE research was identified, synthesized, and coded into emerging themes. Inclusion criteria for this synthesis required articles to (a) be published in a peer-reviewed journal or national/regional American Association for Agricultural Education research conference proceedings, (b) include research specifically pertaining to SAE, (c) be available and accessible through the search procedures, and (d) be published between January 1994 and December 2014. An exhaustive search was conducted using library databases as well as digital journals and conference proceedings. Themes that emerged from this synthesis were (a) participation, (b) teacher education, (c) benefits, (d) professional development, (e) supervision, (f) scope/structure, (g) economic impact, (h) program quality, (i) learning theory, and (k) international settings. Similar to the previous syntheses, research conducted between 1994 and 2014 was primarily descriptive, conceptually broad, and often limited to relatively small populations such as single states. Additional multistate and national studies are recommended to describe the content and context of SAE instruction in teacher education and to refine quality indicators related to SAE practice.

Keywords: Experiential learning; SAE; Supervised agricultural experience

Introduction

In the 1990s, a series of manuscripts were published by Dyer and Osborne (1995, 1996) and Dyer and Williams (1997a, 1997b) based on a synthesis of supervised agricultural experience (SAE) research. These syntheses included SAE research from 1964 through 1993. Dyer and his colleagues identified perceptions, benefits, participation, scope, administration, teacher satisfaction, time requirements, supervision, evaluation, program quality, student and teacher background, facilities, and the relationship between the National FFA Organization (FFA) and SAE as major subject areas in SAE research (Dyer & Osborne, 1995, 1996). SAE research from 1964 through 1993 was described as primarily descriptive and lacking empirical research (Dyer & Osborne, 1995, 1996; Dyer & Williams 1997a, 1997b). Since that time, the philosophical premise of SAE has continued to evolve, which has given rise to the need to synthesize contemporary SAE research conducted over the past 21 years, analyze the findings, and identify areas for future research.

Conceptual Framework

The model used to conceptualize the integral components that form the foundation of a complete school-based agricultural education (SBAE) program consists of three overlapping circles in a Venn diagram (Talbert, Vaughn, Croom, & Lee, 2014). These three components are (a) contextual, inquiry-based learning through classroom and laboratory interaction; (b) leadership

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¹ Bryan D. Rank is a Postdoctoral Scholar in the Department of Agricultural Education Studies at Iowa State University, 226B Curtiss Hall, Ames, IA 50011, bdrank@iastate.edu
² Michael S. Retallick is a Professor and Chair of the Department of Agricultural Education and Studies at Iowa State University, 209A Curtiss Hall, Ames, IA 50011, msr@iastate.edu
engagement through FFA; and (c) planned and supervised, experience-based learning through SAE (Talbert et al., 2014), which is the focus of this study.

The National Council for Agricultural Education (NCAE) has determined “each portion of the title ‘Supervised Agricultural Experience’ is significant in describing what is expected of all teachers and students of agricultural education” (NCAE, 2015, p. 1). The agricultural teacher should provide onsite supervision when possible but also through other methods, such as computer technology, written reports, and group meetings, to assist students in planning and conducting their SAE (NCAE, 2015). Contextually, the SAE is based on agriculture and should form a linkage between agriculture, food, and natural resources instruction, the students’ interests, and career exploration (NCAE, 2015). However, the SAE component differs from other forms of experiential learning practiced in SBAE, such as inquiry-based classroom or lab instruction, field trips, or FFA competitive events, because it includes career planning, is managed by the student, occurs outside of classroom instruction, and occurs in a real-world or a simulated workplace environment (NCAE, 2015).

Supervised experience is likely to have been the first component of the SBAE model to originate and is thought to be rooted in apprenticeships by which youth learned a trade from a skilled craftsman (Croom, 2008). In the early 20th century, agricultural educator Rufus Stimson pioneered the use of the home project method to give students relevant experience. Stimson proposed that projects should be completed in specific learning conditions with measurable results (Croom, 2008). As SAE has evolved through the years, its context has expanded beyond vocational training in production agriculture. Currently, the NCAE (2015) has defined the types of SAE as exploratory, placement/internship, ownership/entrepreneurship, research, school-based enterprise, and service learning.

Although agriculture teachers articulate the value of SAE as they describe it conceptually, they have difficulty implementing it in practice (Dyer & Osborne, 1995; Retallick, 2010; Wilson & Moore, 2007). This paradox between SAE conceptualization and practice is evidenced by SAE practice not adequately reflecting the conceptual foundation of the three-circle agricultural education model (Lewis, Rayfield, & Moore, 2012a, 2012b; Retallick, 2010; Retallick & Martin, 2008; Wilson & Moore, 2007).

Recent efforts by the NCAE and AAAE have focused on SAE renewal. The NCAE has developed a philosophy and guiding principles for including SAE as a component of SBAE. These NCAE documents outline the purpose of SAE as well as describe the types of SAE that SBAE students can conduct (NCAE, 2015). Additionally, the AAAE has developed a guiding philosophy as well as competencies for agricultural teacher preparation in SAE (AAAE, 2014a; 2014b). In light of this focus on SAE renewal, a synthesis of peer-reviewed research is needed to analyze the SAE research published over the past 21 years.

**Purpose**

The purpose of this study was to identify, code, and synthesize contemporary SAE research published between 1994 and 2014. The specific objective was to describe themes that have emerged from SAE research.

**Methods**

According to Thieman, Henry, and Kitchel (2012), “research syntheses are essential to the progression of a particular field of research because they are a collection of past research that is necessary for the systematic construction of knowledge” (p. 84). The focus of this research synthesis was to describe the depth and breadth of SAE research published in the past 21 years.
Search strategies, inclusion criteria, and coding are essential in rigorous research synthesis (Cooper, 2010). The dates for research studies included in this synthesis were from 1994 through 2014. These dates for inclusion were purposefully selected to begin with the research syntheses conducted by Dyer and Osborne (1995, 1996) and Dyer and Williams (1997a, 1997b). The specific search strategies used included an exhaustive search of the library databases, ERIC, and WorldCat. Journal website searches and Google Scholar were also utilized. Keywords and phrases used in the search were 

**supervised agricultural experience** and **experiential learning + agricult***. These keywords provided a sufficient foundation to discover the breadth of research on the subject of SAE.

Research articles identified in the search were documented and analyzed with an initial screening for relevance based on inclusion criteria that were developed (Cooper, 2010). Inclusion criteria for this synthesis required articles (a) to be published in a peer-reviewed journal or national/regional American Association for Agricultural Education (AAAE) research conference proceedings, (b) to include research specifically pertaining to SAE, (c) to be readily available and easily accessible through the search procedures, and (d) to be published between January 1994 and December 2014. It is important to note that research studies not readily available and easily accessible through the search strategy were not included. It is also important to note that it is common for studies presented at national or regional research conferences to be published later in peer-reviewed journals. In cases in which a study was included in a conference proceeding and published in a peer-reviewed journal with no substantive changes, only the journal articles were included in this study.

Articles and conference proceedings that met the inclusion criteria were analyzed and coded within a coding matrix (Cooper, 2010). This matrix included (a) year published, (b) title, (c) author(s), (d) publication, (e) methods/procedures, (f) conclusion(s)/comments, (g) preliminary theme, and (h) final theme. Manuscripts in the matrix were then coded into final themes that emerged based on content. Research studies often address more than one specific area; therefore, they could potentially fit into more than one theme. Studies that fit into multiple themes were coded for final theme based on the predominant theme addressed in the findings and conclusions. The coding matrix categories for publication, methods/procedures, and final theme were analyzed using the IBM SPSS Statistics 19 statistical package, and descriptive statistics were reported.

**Findings**

The search strategies revealed 75 research studies that fit the inclusion criteria. The primary publication used for dissemination of SAE research was the *Journal of Agricultural Education* (n = 48). Peer-reviewed journal articles that met the inclusion criteria were also found in the *Journal of Southern Agricultural Education Research* (n = 12) and the *Journal of Career and Technical Education* (n = 3). Altogether, 63 of the 75 manuscripts that fit within the search criteria were published in peer-reviewed journals. Research was also published in the national (n = 6) and regional (n = 6) conference proceedings of the AAAE.

Most SAE research methods were descriptive and often based on the participants’ perceptions. The most common method of data collection was a survey instrument (n = 45) followed by Delphi techniques (n = 7). However, research studies were also identified that used mixed methods; qualitative methods such as interviews, focus groups, historical perspectives, and research syntheses; as well as quantitative analyses of longitudinal trend studies, economic impact, or test scores.

Research studies that met the inclusion criteria were coded into themes based on the predominant theme addressed in their findings and conclusions. The themes that emerged from this synthesis were (a) participation, (b) teacher education, (c) benefits, (d) professional...
development, (e) supervision, (f) scope/structure, (g) economic impact, (h) learning theory, (i) program quality, and (j) international settings (Figure 1).

![Figure 1. The frequency of themes of SAE research articles, 1994-2014.]

**Participation**

Historically, SAE participation has been a concern for agriculture teachers since the beginning of SBAE (Bird, Martin, & Simonsen, 2013). Participation in SAE has been shown to be continually declining (Croom, 2008; Lewis et al., 2012a, 2012b; Retallick & Martin, 2008, Steele, 1997). Steele (1997) found a 10% reduction in SAE participation in New York between 1983 and 1997. In an 11-year trend study, Retallick and Martin (2008) identified a reduction in the percentage of Iowa students participating in SAE, although the overall SBAE enrollment was increasing, indicating a widening gap between SBAE enrollment and SAE participation. Only 46.1% of students in Florida, Indiana, Missouri, and Utah reported having an SAE (Lewis et al., 2012b). SAE participation in practice does not adequately reflect the conceptual foundation of the three-circle agricultural education model (Lewis et al., 2012a, 2012b; Retallick, 2010; Retallick & Martin, 2008).

Although agriculture teachers articulate the value of SAE as they describe it conceptually, they are having difficulty implementing it in practice (Retallick, 2010; Wilson & Moore, 2007). As Wilson and Moore (2007) stated, “there is a paradox between the value teachers place on SAE and the manner in which SAE is being implemented” (p. 89). Considering this paradox, Wilson and Moore suggested that teachers realize the importance of SAE, so rather than spending time and resources to convince agriculture teachers of the value of SAE, resources would be better utilized in training teachers to implement new types of SAE.

Wilson and Moore (2007) argued, even if teachers perceive a task as worthwhile, they may not carry out the task because of the barriers they perceive. According to Wilson and Moore (2007), “the third stage of Locke’s motivational schema (1991) states if teachers perceive barriers to performing a task, even if it is a worthwhile task, they still may not carry out the task” (p. 90). Retallick (2010) identified barriers to SAE implementation as “(a) changing demographics and societal attitudes, (b) mechanics and structure of schools, (c) resource availability, (d) image, and (e) agricultural education system” (p. 64) based on the perspective of agriculture teachers. Additionally, Graham and Birkenholtz (1999) identified a lack of background, training, and
educational materials as a barrier to engaging nontraditional students in SAE. Similarly, Wilson and Moore (2007) identified a need for teachers to be trained in new SAE types; “given the number of students that teachers have in their classes and the time constraints, it may be time to radically think outside the box and embrace new SAE concepts such as agricultural service learning” (p. 90).

From the students’ perspectives, encouragement from agriculture teachers was perceived as an important factor that influenced their participation in SAE (Lewis et al., 2012a). However, in a Delphi study of the characteristics of innovative SBAE programs the agricultural education panelists did not reach consensus on the statement that every student should be involved in a specific SAE (Rayfield, Murphy, Briers, & Lewis, 2012). Additionally, students indicated that they disagreed with the notion that involvement in other school and community activities decreased their participation in SAE programs and indicated that awards had little influence on their participation (Lewis et al., 2012a). With the understanding that agriculture teachers cannot be in more than one place at a time, the help and encouragement of teachers has an influence on student SAE participation (Lewis et al., 2012a). Agriculture teachers who believe that SAE is important and have effective strategies to overcome barriers are more likely to implement SAE (Retallick, 2010).

**Teacher Education**

Preservice agriculture teachers are prepared for the teaching profession using a combination of coursework, early field experience (EFE), and student-teaching. McLean and Camp (2000) found “curricular structure differs widely among agricultural teacher education institutions” (p. 31). In a study of 10 selected agriculture teacher education programs, all of the programs included SAE or an equivalent topic at various points within their curriculum; however, only three of the selected institutions reported a separate SAE course (McLean & Camp, 2000).

Wolf (2011) found that beginning teachers reported the least self-efficacy in the SAE domain in comparison to the classroom and FFA domains, suggesting that more emphasis should be placed on SAE in teacher preparation. In a separate study, Rubenstein, Thoron, and Estepp (2014) found that preservice teachers who had completed their student teaching internship reported moderately high self-efficacy for SAE competencies. These preservice teachers also regarded SAE as an important part of SBAE with 95% of study participants reporting that SAE was important or somewhat important (Rubenstein et al., 2014).

In a study of Texas A&M University agricultural education student teachers, Harlin, Edwards, and Briers (2002) found that, although student teachers continued to regard SAE as an important component of SBAE, perceptions of the importance of SAE declined after their 11-week student teaching experience. However, in a similar study of Oklahoma State University student teachers, the mean composite score for the SAE construct increased following student teaching (Young & Edwards, 2006a). Although Oklahoma preservice teachers perceived that SAE was more important after their student teaching experience, the element related to SAE was rated of lowest importance among all of the elements of their student teaching experience in both the pretest and posttest (Young & Edwards, 2006a). This lower rating of importance in comparison to the other elements of the student teaching experience mirrored the ranking of the SAE construct by Oklahoma cooperating teachers (Young & Edwards, 2006b). Texas cooperating teachers also indicated that they perceived the SAE construct as important; however, they indicated that it was less important than all but one of the constructs comprising the essential elements of the student teaching experience (Edwards & Briers, 2001).

Student teachers have the opportunity to supervise SAE regardless of the semester in which their student teaching experience occurs; however, student teachers in the spring semester devoted more time to supervising SAEs (Robinson, Krysher, Haynes, & Edwards, 2010). Student teachers should supervise a variety of SAEs, but they are limited to the SAEs in existence at their
cooperating centers (Robinson et al., 2010). According to Rubenstein et al. (2014), “SBAE preservice programs should work to promote authentic experiences for preservice teachers to develop, implement, maintain, sustain, evaluate, supervise, and communicate an SAE program” (p. 81).

Benefits

SAE is considered to be beneficial in developing career skills. Ramsey and Edwards (2011) found that a panel of industry experts agreed that students should learn entry-level technical skills through their SAE that will enhance their employability in the agriculture industry. Similarly, a panel of agriculture teachers reached consensus on entry-level career skills that could be learned in each of the seven Oklahoma SBAE pathways (Ramsey & Edwards, 2012). Additionally, Robinson and Haynes (2011) found that alternatively certified teachers in Oklahoma valued SAE as a method to prepare students for careers by developing college and life skills and “these teachers expect the SAE program to teach students responsibility, accountability, and work ethic” (p. 54). Considering the benefits students receive from SAE participation, North Carolina teachers believed students with special needs received the same benefits from participation as do other students but identified fewer opportunities for SAE involvement (Johnson, Wilson, Flowers, & Croom, 2012).

Researchers have also investigated whether there is an academic benefit to SAE participation. Cheek, Arrington, Carter, and Randal (1994) found a low but positive correlation between SAE participation and students’ achievement in agriscience courses. There was also a low but positive association on the science portion of the Georgia High School Graduation Test (GHST) between SAE engagement and student achievement (Ricketts, Duncan, & Peake, 2006). However, in a separate study limited to regular and special education students, SAE activity level did not have a statistically significant relationship with GHST science achievement (Clark, Parr, Peake, & Flanders, 2013).

Marx, Simonsen, and Kitchel (2014) found that SAE has less influence on students’ career decisions than does classroom instruction or FFA. However, SAE offers the opportunity for students to network and build relationships with community members (Robinson & Haynes, 2011).

Professional Development

Developing SAE opportunities for students has been consistently identified among the professional development needs for agriculture teachers (Garton & Chung, 1996, 1997; Layfield & Dobbins, 2002; Ricketts, Duncan, Peake, & Uesseler, 2005; Sorensen, Tarpley, & Warnick, 2010). Wolf (2011) recommended that SAE management become “a focus of professional development for beginning teachers” (p. 172) to increase their self-efficacy in the SAE domain. The need for professional development regarding developing SAE opportunities for students as well as supervising SAE programs for all students ranked highly in a study of middle and high school agriculture teachers, with middle school teachers ranking these two topics higher than high school teachers did (Roberts & Dyer, 2003). In addition to developing and supervising SAE programs, agriculture teachers perceived preparing FFA proficiency award and degree applications as areas in which they needed continuing education (Garton & Chung, 1996, 1997; Layfield & Dobbins, 2002; Ricketts et al., 2005; Sorensen et al., 2010; Swafford & Friedel, 2010).

Supervision

To be successful, agriculture teachers must be capable of facilitating SAE by actively supervising student projects through planning and visits (Roberts, Dooley, Harlin, & Murphrey, 2007). Similarly, Roberts and Dyer (2004) described the characteristics of effective teachers related to SAE as having SAE knowledge as well as actively supervising and encouraging their
students’ projects. Tennessee agriculture teachers indicated that teachers should be involved in planning and supervising SAEs and that SAE supervision should be part of their duties during their extended summer contract (Swortzel, 1996). However, the amount of time agriculture teachers spent supervising SAEs varies throughout the year (Torres, Ulmer, & Aschenbrener, 2008). Torres et al. (2008) recommended “teachers need to distribute their time more consistently over the year when making SAE observations rather than allowing this task to be a seasonal effort” (p. 85).

Administrators in Oklahoma indicated that the first-year agriculture teachers they supervised performed in the range from good to excellent in providing adequate supervision to students’ projects and requiring students to maintain record books but only fair to good in requiring all students to conduct meaningful SAE programs (Weeks & Terry, 1999). Similarly, principals in North Carolina expressed positive perceptions of SAE but did not think that SAE opportunities were provided to all students (Rayfield & Wilson, 2009). These North Carolina principals agreed that agriculture teachers should be employed on a year-round contract but did not think that agriculture teachers were conducting SAE visits during the summer months (Rayfield & Wilson, 2009). Rayfield and Wilson (2009) recommended that principals express their perceptions of the value of SAE to teachers through recognition and evaluations based on SAE implementation and supervision.

Scope/Structure

The scope and structure of SAE have evolved over time. The Vocational Education Act of 1963 expanded the scope of agricultural education and ended mandatory SAE (Graham & Birkenholtz, 1999; Martin, 2010). Prior to the passage of the act, local programs were already developing a broader view of SAE (Martin, 2010). According to Martin (2010), “the rise of nonproduction SAEs and agriculturally-related occupational curriculum was stimulated by local community needs and not federal legislation” (p. 51). More recently, increasing enrollment of nonfarm students in agricultural education led to an increase in placement SAEs in Missouri between 1988 and 1997 (Graham & Birkenholtz, 1999). In addition to changing demographics, “as the scope of agriculture broadens, our concept of Supervised Agricultural Experience must be altered to meet the demand of students interested in new areas of agriculture” (Camp, Clarke, & Fallon, 2000, p. 20). For example, Texas agriculture teachers acknowledged that students should be involved in biotechnology-related SAEs (Mowen, Wingenbach, Roberts, & Harlin, 2007).

Roberts and Harlin (2007) recommended that agriculture teachers consider the individual goals of students to encourage appropriate projects. According to Roberts and Harlin (2007), “this implies that although two students may have similar projects, the intended learning outcomes may differ considerably (e.g., technical skill mastery vs. personal development)” (p. 53). For example, Rayfield and Croom (2010) proposed developing and encouraging age-appropriate research and exploratory SAEs in middle school programs that can be expanded upon when the students reach high school. Although new classifications of projects have been added to be more inclusive of the types of projects students conduct, there is a risk that the scope of innovative projects may be changed to fit into an existing category (Roberts & Harlin, 2007).

Economic Impact

SAE has been shown to have a substantial economic impact (Graham & Birkenholtz, 1999; Hanagriff, Murphy, Roberts, Briers, & Linder, 2010; Retallick & Martin, 2005; West & Iverson, 1999). Graham and Birkenholtz (1999) reported that in 1997 the average SAE student labor income from ownership and placement SAEs in Missouri was $1,994 per student for a statewide total of over $31.8 million in SAE labor income. This total is nearly double the total of SAE student labor income in Missouri for 1988 (Graham & Birkenholtz, 1999). Research conducted by West and Iverson (1999) showed that typical Georgia SBAE programs in the late 1990s contributed $31,336
from entrepreneurship, $39,176 from placement, and $832 from improvement SAEs for a total contribution of $71,344 per department to their local economies. This local SAE program economic value was extrapolated to estimate a statewide total economic value of over $12 million derived from SAE programs in Georgia (West & Iverson, 1999). More recently, an 11-year trend study in Iowa showed that the average return from SAE per tax dollar invested in a SBAE program was $1.66 and that the annual growth rate of return on tax dollars was 5.47% (Retallick & Martin, 2005). Over these 11 years (1991-2001), the total value of SAE earned income and value of unpaid hours in Iowa grew at an average annual rate of 6.05% from nearly $10.4 million to nearly $18.7 million (Retallick & Martin, 2005). In Texas, Hanagriff et al. (2010) showed annual economic impact of nearly $189.4 million from animal, horticulture, and crop entrepreneurship SAEs and associated travel expenses.

Program Quality

Researchers have investigated SAE program quality in an effort to identify and develop program quality indicators. Quality indicators for SAEs identified by Jenkins and Kitchel (2009) included diversity in SAE types; time for agriculture teacher supervision; up-to-date recordkeeping; assistance by instructors, parents, and employers; goal setting; and student satisfaction. Similar SAE quality themes emerged from a focus group of American FFA Degree Star finalists including goal planning and authentic learning that leads to career growth, utilization of program partners (e.g., agriculture teachers, parents, and the community), personal satisfaction, and complete records (Rubenstein & Thoron, 2014). Additional SAE quality themes identified by the American FFA Degree Star finalists included income from the SAE program, FFA participation awards, and degrees, as well as hard work and program growth (Rubenstein & Thoron, 2014).

Learning Theory

According to Baker, Robinson, and Kolb (2012), “traditionally, educators have identified SAE programs as the primary experiential learning tool in agricultural education” (p. 8). Experiential learning theory is based on the constructivist view that learning is a process of connecting experiences (Baker et al., 2012). This relationship with constructivism is further described as SAE practice being rooted in the middle-range theory of experiential learning and falls within the spectrum of the grand theories of social constructivism and cognitive constructivism (Martin & Henry, 2011).

Baker et al. (2012) stated that SAE does not necessarily need to be directly connected to what is taught in the classroom, adding, “what is most important, however, is allowing students to identify an area of interest or passion and assisting them in building a project around that area of interest” (p. 6). Meaningful learning in SAE requires purposeful cognitive processing to make meaning of concrete experiences (Baker et al., 2012). According to Martin and Henry (2011), “learning needs to be intentional not accidental” (p. 221).

International Settings

Two studies were found that described the concept of SAE applied in international settings. Although this synthesis was focused primarily on SAE as a component of SBAE in the United States, these two studies were included because they show how the same SAE concept can be applied in areas around the world and because the inclusion criteria did not limit SAE to the United States. A study conducted in Uganda showed that the SAE method contributed to students’ learning and the transfer of that learning to the students’ home farms (Okiror, Matsiko, & Oonyu, 2011). The study found that of the two groups - home gardening and school gardening - the school gardening group was slightly more successful in comparison to the students with home gardens. Okiror et al. (2011) attributed the lower performance of the home gardening groups to weaker
supervision by teachers during home visits and, furthermore, found that home gardens, as well as school gardens, should be used in agricultural education in Uganda and that the teachers should be trained in SAE methods to better supervise home visits. Egyptian agricultural technical school teachers were surveyed to determine their knowledge and application of placement SAE competencies (Barrick, Roberts, Samy, Thordon, & Easterly, 2011). In comparison to needs assessments conducted in the United States that include SAE, the Egyptian teachers had in-service needs similar to their counterparts in the United States (Barrick et al., 2011).

Conclusions and Recommendations

Contemporary SAE research has focused primarily on student participation, the benefits of SAE, preservice teacher education, and professional development for practicing teachers. The most common research methods revealed in this synthesis were descriptive and based primarily on study participants’ perceptions. SAE research was contextually broad and, with few exceptions, focused on relatively small populations, such as single states. The extensive use of survey methods and the broad context of research conducted are consistent with the findings of Dyer and Osborne (1995, 1996) and Dyer and Williams (1997a, 1997b) relating to SAE research conducted between 1964 and 1993. Perhaps the most important conclusion that can be drawn from this synthesis is that contemporary SAE research is still focused on very similar themes to the ones that were identified over 20 years ago. Together with the previous work of Dyer and his colleagues, this synthesis provides a 50-year overview of SAE research. Over this period, it is apparent that there is a need for experimental and quasi-experimental research in addition to larger multistate and national descriptive studies to provide empirical data relating to SAE research questions.

Although agriculture teachers value the concept of SAE and can describe it conceptually, they are having difficulty implementing it in practice (Dyer & Osborne, 1995; Retallick, 2010; Wilson & Moore, 2007). Wilson and Moore (2007) concluded professional development for agriculture teachers should not be focused on the need for SAE or its value; “teachers already know the politically correct answer” (p. 89). Rather, teachers need professional development focused on improving quality and implementation of SAE in their programs (Wilson & Moore, 2007). Descriptive and empirical research are needed to identify practical methods that preservice and in-service agriculture teachers can use to implement and manage SAE programs as well as research to identify how best to disseminate this information to preservice and in-service teachers. More research is also needed to identify where and to what extent SAE instruction occurs within agriculture teacher education programs as well as the content and context of the preservice SAE curriculum. Two such research topics to consider are the extent to which the SAE philosophy (AAAE, 2013a) and SAE competencies (AAAE, 2013b) for agriculture teacher education are incorporated into the teacher education curriculum in programs across the country as well as the approach teacher educators use to teach these competencies and objectives.

Research has shown that SAE can be a beneficial learning experience (Dyer & Williams, 1997a; Ramsey & Edwards, 2004; Rickets et al., 2006) and is valued by stakeholders (Rayfield & Wilson, 2009). However, more research is needed to identify new methods and strategies to overcome barriers and increase participation in this learning opportunity for all SBAE students. Wilson and Moore (2007) suggested that agriculture teachers should have professional development focused on implementing new types of SAE such as service learning. The NCAE (2015) has recognized school-based enterprise and service learning as new SAE types. Professional development efforts are needed to increase awareness of these new SAE types and to provide teachers with the tools to implement them. Agriculture teachers play a role in student participation by encouraging the students to develop an SAE (Lewis et al., 2012a). These new SAE types offer agriculture teachers new options to use to encourage students to develop SAE programs. Research
should be conducted to describe how and to what extent agriculture teachers encourage participation.

Additional research should be conducted to develop SAE quality indicators based on learning objectives. It is imperative for the profession to decide what learning outcomes are expected from a quality SAE program. SAE is perceived to build employability skills, such as responsibility and positive work attitudes (Dyer & Williams, 1997a; Robinson & Haynes, 2011), as well as provide students with entry-level career skills (Ramsey & Edwards, 2011, 2012). A method or guideline to quantify the extent to which these skills are achieved is needed. Multistate or national studies should be conducted to determine quality indicators for all SAE types and if the same quality indicators apply to all SAE programs or if program quality is best determined at the local level.

SAE continues to be an area of the SBAE model that has difficulty achieving a high degree of participation (Bird et al., 2013; Croom, 2008; Lewis et al., 2012a, 2012b; Retallick & Martin, 2008, Steele, 1997). Standards, best practices, and educational materials should be developed and improved to help agriculture teachers involve more of their students in SAEs as well as plan and supervise the broad variety of SAEs. SAE competencies, course objectives, and lesson plans have been developed for teacher education (Barrick et al., 2015). These educational materials are readily available and provide a framework to prepare preservice teachers to conduct successful SAE programs. A similar effort is needed to develop national competencies, professional development, and curriculum materials to assist teachers in overcoming perceived barriers to implementing SAE and to communicate clear learning objectives to students, parents, and school administrators. If SAE is to remain a viable part of SBAE for all students, it is essential to develop quality indicators and learning outcomes for each type of SAE to measure its effectiveness as well as develop SAE educational materials agriculture teachers can use to address specific barriers to SAE participation and facilitate student learning.

References


A National Study of Work-Family Balance and Job Satisfaction among Agriculture Teachers

Tyson J. Sorensen¹, Aaron J. McKim², and Jonathan J. Velez³

Abstract

This national study sought to extend previous research on the work-family balance (WFB) ability of secondary school agriculture teachers. We utilized data from a simple random sample of agriculture teachers to explore the relationships between work and family characteristics, WFB ability, and job satisfaction. Work role characteristics of interest included weekly work hours, years of teaching experience, and average number of students per class. Family role characteristics included marital status and number of children. Additionally, we considered the influence of other life roles on WFB ability. The number of weekly work hours and being married were significant, negative predictors of WFB ability, while years of teaching experience, average number of students per class, other life roles, and number of children were not statistically significant. In total, work and non-work characteristics accounted for 19% of the variance in the WFB ability of secondary school agriculture teachers. Additionally, teachers in this study reported only moderate levels of WFB ability and job satisfaction. Finally, a significant, positive relationship between WFB ability and job satisfaction was identified. The findings from this research are discussed using the conservation of resources theory, with recommendations and implications highlighted for the agriculture teaching profession.

Keywords: work-family balance; job satisfaction; family role; work hours

Introduction and Theoretical Framework

Research exploring the work-family balance (WFB) ability of secondary school agriculture teachers is an emerging theme in agricultural education literature (Crutchfield, Ritz, & Burris, 2013; Lawver, 2007; Murray, Flowers, Croom, & Wilson, 2011; Sorensen & McKim, 2014). This theme emerged, in part, due to the suggested relationship between teacher attrition, a continued concern within agricultural education (Foster, Lawver, & Smith, 2014), and teachers’ inability to balance multiple life roles (Grandey & Cropanzano, 1999). WFB ability, the construct of interest in this study, refers to an individual’s capacity to successfully manage the demands of both work and family roles. Therefore, research into WFB ability helps to illuminate a critically important aspect of teacher retention. The purpose of this study was to analyze the antecedents and outcomes of WFB ability among a national sample of secondary school agriculture teachers.

In an effort to understand WFB ability among agriculture teachers, we utilized the conservation of resources (COR) theory as our framework (Grandey & Cropanzano, 1999; Hobfoll, 1989). COR theory has been widely used in studies examining the interface between work and family roles among teachers outside of agricultural education (Grandey & Cropanzano, 1999). More specifically, recent research within education has explored job stress and burnout among

¹ Tyson J. Sorensen is an Assistant Professor of Agricultural Education in the School of Applied Sciences, Technology and Education at Utah State University, 2300 Old Main Hill, Logan, UT 84322, tyson.sorensen@usu.edu.
² Aaron J. McKim is an Assistant Professor of Agriculture, Food, and Natural Resources Education in the Department of Community Sustainability at Michigan State University, 480 Wilson Road Room 131, East Lansing, MI 48824, amckim@msu.edu.
³ Jonathan J. Velez is an Associate Professor in the Department of Agricultural Education and Agricultural Sciences at Oregon State University, 108 Strand Agriculture Hall, Corvallis, OR 97331, jonathan.velez@oregonstate.edu.
teachers, as framed by the COR theory (Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007; Betoret, 2006; Klusmann, Kunter, Trautwein, Lüdtke, & Baumert, 2008; Okonkwo, 2013; Schorn & Buchwald, 2006).

Conservation of resources theory suggests individuals seek to build and protect resources such as energies (e.g. time), conditions (e.g. married status, parental status, tenure), and personal characteristics (e.g. self-esteem, satisfaction) within their life roles. When these resources are lost or threatened, a psychological stress reaction develops, such as dissatisfaction or depression, which can lead to attrition within a life role (Grandey & Cropanzano, 1999). Time is one of the more challenging resources to balance between multiple life roles. Time in one life role has the potential to be lost or threatened, especially when increased obligations alter the time commitment in other life roles (Grandey & Cropanzano, 1999). For example, the time an agriculture teacher spends with his or her family may be threatened when the teacher coaches an additional FFA career development team. In this study, we focused on secondary school agriculture teachers’ ability to balance time between work, family, and other life roles.

Research supports the notion that agriculture teachers often navigate roles outside of teaching (Goode & Stewart, 1981). As a result, resources such as time must be protected to increase satisfaction and reduce stress within all life roles. The demanding nature of the agriculture teaching profession (Lambert, Ball, & Tummons, 2011; Lawver, 2007; Murray et al., 2011) necessitates a robust WFB ability in order to protect time, increase satisfaction, and reduce stress. In this study, we considered how the obligations of work and family roles among agriculture teachers relates to their WFB; additionally, we analyzed how WFB ability was related to job satisfaction, an essential element to the retention of agriculture teachers in the profession (Blackburn & Robinson, 2008).

Literature Review

The purpose of this research was to explore how work and family roles relate to agriculture teachers’ WFB ability as well as the relationship between WFB ability and job satisfaction. Within this review of literature, we explored (a) the workplace variables that may influence WFB ability, (b) family and other life roles that may influence WFB ability, and (c) existing research into the relationship between WFB ability and job satisfaction among agriculture teachers.

Workplace Characteristics to Consider

Existing research has identified an inverse relationship between the number of hours worked and WFB ability among agriculture teachers. More specifically, research suggests working long hours is one of the major challenges faced by agriculture teachers (Miller & Scheid, 1984; Moore & Camp, 1979; Mundt & Connors, 1999). High teacher stress has been linked to these overburdening workloads (Boland, King, Williams, Duncan, & Ricketts, 2010; Boone & Boone, 2007; Edwards & Briers, 1998; Lambert et al., 2011; Moore & Camp, 1979; Mundt & Connors, 1999; Myers, Dyer, & Washburn, 2005; Newcomb, Betts, & Cano, 1987; Talbert, Camp, & Heath-Camp, 1994; Torres, Lawver, & Lambert, 2009). Based on prior research, we included the number of hours agriculture teachers work during the week and weekend as a potential variable influencing WFB ability.

In addition to work hours, we identified the importance of years of teaching experience when analyzing WFB ability. Grzywacz and Marks (2000) found younger employees reported less WFB ability than older employees. This research highlights more experienced employees have likely gained additional expertise managing the demands of their work role without infringing upon family responsibilities (Cinamon & Rich, 2005). Therefore, in this study of WFB ability, we considered years of classroom experience as a potential predictor.
Because time is the central resource of focus within this study, characteristics of the workplace that could affect the workload of agriculture teachers, like the number of students per class, should also be considered. Additionally, research outside of agricultural education has linked class size as a negative predictor of WFB ability (Theobald, 1990), suggesting larger classes require additional resources within the workplace. Therefore, we considered the number of students per class in our analysis of WFB ability among secondary school agriculture teachers.

**Family and Other Life Role Characteristics to Consider**

Many characteristics of the family role can take time and energy away from the work role, resulting in difficulty balancing work and life roles. One family domain characteristic requiring time and energy is marriage. However, the literature has produced mixed findings concerning the relationship between marital status and WFB ability, with many studies failing to confirm a statistically significant relationship (Grandey & Cropanzano, 1999). In agricultural education, Sorensen and McKim (2014) found marital status had no effect on the ability of Oregon agriculture teachers to balance their work and family responsibilities. However, Bruening and Hoover (1991) found agriculture teachers, in a national study, reported marriage as the least positive factor influencing their performance as a teacher. Additionally, Odell, Cochran, Lawrence, and Gartin (1990) found the marital satisfaction of an agriculture teacher’s spouse had a significant influence on the job satisfaction of the teacher. Due to the discrepancy in findings and the limited research among agriculture teachers from across the country, we sought to examine the relationship between WFB ability and marital status.

In addition to the potential for marriage to influence WFB ability, the number of children an agriculture teacher is responsible for may also influence the time requirements in their family role. Within agricultural education literature, the number of children an agriculture teacher is responsible for at home has been identified as a negative predictor of job satisfaction (Odell et al., 1990) and job performance (Bruening & Hoover, 1991). Despite these findings, Sorensen and McKim (2014) found the presence of dependent children had no effect on the ability of Oregon agriculture teachers to balance work and family responsibilities. Additionally, research outside agricultural education has failed to identify a significant relationship between number of children and WFB ability (Cinamon & Rich, 2005). However, discrepancy in findings and lack of a current, national analysis provides merit for inclusion in this research.

Work and family roles have received most of the attention in research because work and family are the principal components of people’s lives and a great deal of time and energy is often spent by individuals trying to manage the responsibilities of these roles. However, the COR theory reaches across multiple life roles outside work and family. In agricultural education, it is common for teachers to take on multiple roles within the job, community, church, and family (Goode & Stewart, 1981). Therefore, we examined life roles beyond just the work and family domains when considering the WFB ability of agriculture teachers.

**WFB Ability and Job Satisfaction**

Existing research exploring the level of WFB ability among agriculture teachers yields conflicting results, with some studies suggesting agriculture teachers struggle to balance multiple life roles (Foster, 2001; Murray et al., 2011; Sorensen & McKim, 2014) and other research identifying high WFB ability among agriculture teachers (Crutchfield et al., 2013). While there is disagreement in the level of WFB ability, researchers agree that WFB ability is an important variable for continued analysis in agricultural education (Crutchfield et al., 2013; Lawver, 2007; Murray et al., 2011). The time commitment associated with being an agriculture teacher leaves little time to devote to other life roles (Lawver, 2007; Murray et al., 2011; Sorensen & McKim,
2014; Straquadine, 1990). According to the COR theory, excessive time constraints strain WFB ability and can result in job dissatisfaction.

Despite reported work-family balance issues among agriculture teachers and high workloads, studies indicate agriculture teachers are largely satisfied with their jobs (Cano & Miller, 1992; Castillo, Conklin, & Cano, 1999; Chenevey, Ewing, & Whittington, 2008; Grady & Burnett, 1985; Kitchel et al., 2012; Ritz, Burris, & Brashears, 2013; Walker, Garton, & Kitchel, 2004). However, the positive relationship between WFB ability, career commitment (Chaney, 2007; Crutchfield et al., 2013; Sorensen & McKim, 2014), and job satisfaction (Sorensen & McKim, 2014) suggests WFB ability is a variable worthy of analysis within agricultural education.

Additional justification for exploring WFB ability emerges from identified limitations of research on the WFB ability of agriculture teachers. Research exploring the relationship between WFB ability, job satisfaction, and career commitment has been limited to a specific gender (Foster, 2001), state (Chaney, 2007; Murray et al., 2011; Sorensen & McKim, 2014), or geographic region (Crutchfield et al., 2013). In this study, we sought to build from existing research by conducting the first national analysis of the relationship between WFB ability and job satisfaction. Additionally, we sought to extend the literature by exploring the relationship between work and family variables and their relationship with agriculture teachers’ WFB ability within one, comprehensive model. As the literature on this topic has come from only a few states and regions, this national research extends the literature to encompass the entire profession.

In addition to the identified limitations within the literature exploring the WFB ability of agriculture teachers, teacher turnover may have contributed to the current shortage of qualified agriculture teachers (Foster et al., 2014; Kantrovich, 2010). Insights into the ability of agriculture teachers to manage, cope, and prioritize multiple life roles can provide valuable information into agriculture teachers’ job satisfaction and intent to remain in the profession. Figure 1 provides a conceptual model for this study. The model represents WFB ability as a critical element to building and protecting resources within work, life, and other life roles. For this study, the outcome of WFB ability we sought to understand was job satisfaction.

![Figure 1. A conceptual model of work roles, family roles, other life roles, work-family balance ability, and job satisfaction (adapted from Sorensen & McKim, 2014).](image-url)
Purpose and Objectives

The purpose of this research was to extend existing literature on the WFB ability of secondary school agriculture teachers by conducting a national analysis of the relationship between work variables, family variables, WFB ability, and the relationship between WFB ability and job satisfaction. Given the identified relationships between WFB ability, career commitment, and job satisfaction (Chaney, 2007; Crutchfield et al., 2013; Sorensen & McKim, 2014), this analysis addresses National Research Priority three, which calls for research into a “sufficient scientific and professional workforce” (Roberts, Harder, & Brashears, 2016, p. 9). The following research objectives guided the development and execution of our research:

1. Describe the work and family characteristics of responding teachers including other life roles.
2. Determine the relationship between work and family characteristics and agriculture teachers’ work-family balance ability.
3. Determine the relationship between work-family balance ability and job satisfaction among secondary school agriculture teachers.

Methods

We utilized survey methods to determine the work characteristics, family characteristics, work-family balance ability, and job satisfaction of a national sample of secondary school agriculture teachers. The instrument used in this research was designed and distributed to a simple random sample of agriculture teachers in the United States using the online survey system Qualtrics. We opted for online survey methodology because it provided low cost data collection from a large geographical area with relative ease to input data from a large sample (Dillman, 2007). Data collected for this study are part of a larger research project exploring the work and family interface among school-based agricultural educators.

The target population for this study included all secondary school agriculture teachers during the 2014-2015 school year who self-identified as being active participants in a family role. Secondary school agriculture teachers were identified as those teachers who taught at least one middle school or high school agriculture class during the 2014-2015 school year. In addition to participants being secondary school agriculture teaches, we sought teachers who self-identified as active participants in a family role. Family role participation, defined by the researchers as “any and all committed relationships that might influence how time is invested in the non-work domain,” was an important qualifier given our interest in the ability of teachers to balance work and family roles.

The initial sample for this study was pulled from the list of secondary school agriculture teachers managed by the National FFA Organization. Using sample size determination formulas (Cochran, 1977; Krejcie & Morgan, 1970), we requested an appropriate sample size of 778 agriculture teachers. The survey instrument was sent utilizing protocols from Dillman’s (2007) tailored design method to all 778 potential respondents. A total of 75 emails bounced and 34 respondents did not meet the population parameters (i.e. not secondary school agriculture teachers or did not self-identify as being active participants in a family role). Of the remaining 669 potential respondents, 234 (n = 234; 34.98% response rate) provided usable responses.

Our goal was to infer our findings to the population of secondary school agriculture teachers during the 2014-2015 school year; therefore, we considered the potential for non-response bias using the guidelines outlined by Lindner, Murphy, and Briers (2001). Due to the limited contact information provided in the frame (i.e. only email and teacher names were provided), no attempt was made to contact non-respondents via telephone. Thus, the data of on-time respondents (n = 199) were compared with late-respondents (n = 35) for the variables of interest using an
independent samples $t$-test to determine if any systematic differences existed (Lindner et al., 2001). No statistically significant differences existed between on-time and late respondents (i.e. $p$-values $> .05$) were identified for the variables of interest. Therefore, we considered non-response error to be insignificant to this study (Lindner et al., 2001; Miller & Smith, 1983).

The variables of interest for our analysis were workplace characteristics, family characteristics, work-family balance ability, and job satisfaction. The workplace characteristics included weekly work hours during the regular school year, years of teaching experience, and average number of students per class. Family characteristics included marital status and number of children. We also controlled for other life roles by including a variable, ranging from zero to six, in which respondents indicated the number of additional life roles they were involved in from a list of potential life roles (i.e. student, church member, coach, employee outside of agriculture teaching, community leader, or other). Controlling for external life roles provided a better glimpse into how agriculture teachers balance their agricultural educator and family responsibilities in light of other life roles.

The WFB ability and job satisfaction of responding agriculture teachers were measured using previously established instruments. WFB ability was measured using a three-item instrument, originally developed by Chaney (2007). An example item from this construct states, “I am able to balance quality time between my work and my family commitments.” Job satisfaction was measured using the five-item construct, initially developed by Judge, Bono, and Locke (2000). An example item from this construct states, “I find real enjoyment in my work.” Participants rated each item within the two constructs on a six-point scale ranging from one (strongly disagree) to six (strongly agree) with higher responses indicating higher WFB ability or higher job satisfaction, respectively.

Face and content validity for the instrument were evaluated by a panel of experts which included professors and graduate students within the College of Education and College of Agricultural Sciences at Oregon State University. Additionally, the instrument was pilot tested for reliability among 30 career and technical educators in Oregon. Using the established minimum reliability level of .70 (Nunnally & Bernstein, 1994), results from the pilot test indicated the constructs of interest were reliable (i.e. Cronbach’s alphas for job satisfaction = .86 and WFB ability = .91). Additionally, post-hoc analyses revealed the constructs of interest met the established level of reliability among the population of interest (Streiner, 2003) (i.e. Cronbach’s alphas for the post-hoc analysis for job satisfaction = .88 and WFB ability = .92).

Research objective one (i.e. describe the work and family characteristics of responding teachers) was accomplished by analyzing and presenting demographic data. Research objective two (i.e. determine the relationship between work and family characteristics and agriculture teachers’ WFB ability) was achieved using a multiple linear regression with weekly work hours, years of teaching experience, average number of students per class, marital status, number of children, and other life roles as independent variables and WFB ability as the dependent variable. Research objective three (i.e. determine the relationship between work-family balance and job satisfaction among secondary school agriculture teachers) was analyzed using a simple linear regression with WFB ability as the independent variable and job satisfaction as the dependent variable. For research objectives two and three, which utilized inferential statistics, an a priori statistical significance level of $p$-value < .05 was established.

Before data analysis, we considered the assumptions of parametric data and the assumptions of regression. Specific to parametric data, we found the variances to be the same throughout the data and the data to be independent, meeting the established assumptions. However, one variable (i.e. weekly work hours) was not normally distributed due to extreme outliers. This issue was remedied by trimming and replacing outlier values with the value of the most extreme response not identified as a statistical outlier (Guttman & Smith, 1969; Moyer & Geissler, 1991).
Additionally, data were analyzed for the assumptions of multiple linear regression (i.e. multicollinearity, homoscedasticity, and linearity between predictor and outcome variables) with data meeting the established assumptions.

**Findings**

The first objective of this study was to describe the work and family characteristics of agriculture teachers, including other life roles. For workplace variables, responding agriculture teachers reported working, on average, 55.77 hours \((SD = 10.34)\) per regular work week plus an additional 4.04 hours \((SD = 3.33)\) per weekend during the regular school year for a total of 59.81 hours per week. Responding agriculture teachers had an average of 17.75 years of teaching experience \((SD = 10.22)\) and taught an average of 20.19 students per class \((SD = 7.83)\). For the family variables, 93.24% of responding teachers indicated they were married at the time of data collection. Additionally, responding agriculture teachers indicated having responsibility for an average of 1.67 \((SD = 1.42)\) children.

Participants were asked to select from a list of statements regarding the question, “besides ‘teacher,’ what other life roles do you actively participate in?” The roles of spouse and parent were the most commonly selected responses among all participants while student and coach were the least selected roles. Table 1 shows a breakdown of participation in other life roles outside of teaching. Respondents were also given on open ended prompt in which they could list additional life roles not included on the list; responses included caregiver for elderly or special needs adults, volunteer emergency personnel, horse trainer or riding instructor, referee or sports team member, researcher, actor, and adjunct college instructor.

<table>
<thead>
<tr>
<th>Life Roles of Respondents</th>
<th>(f)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spouse (e.g., husband, wife, widowed)</td>
<td>201</td>
<td>88.16</td>
</tr>
<tr>
<td>Parent (e.g., mother, father)</td>
<td>173</td>
<td>75.88</td>
</tr>
<tr>
<td>Church member (e.g., volunteer)</td>
<td>146</td>
<td>64.04</td>
</tr>
<tr>
<td>Community leader (e.g., civic leader)</td>
<td>118</td>
<td>51.75</td>
</tr>
<tr>
<td>Employee/ manager/ owner (e.g., farmer)</td>
<td>86</td>
<td>37.72</td>
</tr>
<tr>
<td>Coach- non Ag. Ed. (e.g., athletics)</td>
<td>55</td>
<td>24.12</td>
</tr>
<tr>
<td>Student</td>
<td>40</td>
<td>17.54</td>
</tr>
</tbody>
</table>

The second objective was to determine the relationship between work and family characteristics and agriculture teachers’ WFB ability (see Table 2). Agriculture teachers in this study slightly agreed they could balance work and family roles \((M = 4.02, SD = 1.06)\). We simultaneously entered the work and family variables into a regression as independent variables with WFB ability as the dependent variable and other life roles as a control variable. In combination, the work and family characteristics produced a statistically significant model \((F = 6.63; p\text{-value} < .001)\) and accounted for 19% of the variance in agriculture teachers’ WFB ability.
The number of hours agriculture teachers reported working each week, including weekends, during the regular school year was a statistically significant, negative predictor of WFB ability ($\beta = -.37; p\text{-value} < .001$). Additionally, the indicator variable for teachers being married was a statistically significant, negative predictor of WFB ability ($\beta = -.16; p\text{-value} = .018$).

### Table 2

**Relationship between Work and Family Characteristics and Work-Family Balance**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Dependent Variable: Work-Family Balance Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zero-order correlation ($r$)</td>
</tr>
<tr>
<td>Weekly Work Hours</td>
<td>-.38</td>
</tr>
<tr>
<td>Years of Teaching Experience</td>
<td>.18</td>
</tr>
<tr>
<td>Average Students per Class</td>
<td>.01</td>
</tr>
<tr>
<td>Married</td>
<td>-.16</td>
</tr>
<tr>
<td>Number of Children</td>
<td>.11</td>
</tr>
<tr>
<td>Other Life Roles</td>
<td>.02</td>
</tr>
</tbody>
</table>

*Note. $R = .43$, $R^2 = .19$, $F = 6.63$, $p$-value < .001. Weekly work hours included average hours worked during week and weekend within a regular school year. Married variable was coded as an indicator variable with zero “Unmarried” and one “Married.” Other Life Roles was coded from zero to six based on the total number of external life roles (e.g. coach, community leader) respondents indicated they participated in. Work-family balance ability items scaled from one (*strongly disagree*) to six (*strongly agree*). An *a priori* statistical significance level of $p$-value < .05 was established.*

The third research objective sought to determine the relationship between WFB ability and responding agriculture teachers’ job satisfaction (see Table 3). Agriculture teachers slightly agreed to agreed they were satisfied with their job as an agriculture teacher ($M = 4.67$, $SD = 0.89$). The simple linear regression model with WFB ability as the independent variable and job satisfaction as the dependent variable was statistically significant ($F = 20.52; p$-value < .001) with 8% of the variance in agriculture teachers’ job satisfaction ($R^2 = .08$) being accounted for by WFB ability ($\beta = .29; p$-value < .001).
Table 3

Relationship between Work-Family Balance Ability and Job Satisfaction

<table>
<thead>
<tr>
<th>Variable</th>
<th>Zero-order correlation (r)</th>
<th>p-value</th>
<th>B</th>
<th>SEB</th>
<th>β</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFB Ability</td>
<td>.29</td>
<td>&lt;.001</td>
<td>.24</td>
<td>.05</td>
<td>.29</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Note. $R = .29$, $R^2 = .08$, $F = 20.52$, $p$-value < .001. Work-family balance ability items scaled from one (strongly disagree) to six (strongly agree). An a priori statistical significance level of $p$-value < .05 was established.

Conclusions, Recommendations, and Discussion

The purpose of this study was to strengthen and further existing literature within agricultural education on the work-family balance ability of secondary school agriculture teachers. Specifically, our goal was to add new understandings about work-family balance by conducting the first known national study of this construct within agricultural education. Prior to this research, only a few states were represented in WFB research, creating a substantial gap in the literature on WFB ability and job satisfaction. Our objectives were achieved by collecting data on work characteristics, family characteristics, WFB ability, and job satisfaction from a simple random sample of agriculture teachers in the National FFA database. In the first objective, we analyzed the work and family characteristics of responding teachers. This information provides valuable data, from a national sample of agriculture teachers, concerning work and family characteristics during the 2014-2015 school year.

On average, agriculture teachers in this study worked over 55 hours per work week and close to 60 hours per week when weekend hours were included. These findings are consistent with existing research indicating agriculture teachers often work well beyond a 40-hour work week (Chaney, 2007; Murray et al., 2011; Torres et al., 2009). Agriculture teachers working excessive work hours may be the result of inefficiency or inability to complete necessary job requirements in a timely manner, which would have implications for professional development opportunities. On the other hand, these findings could be an indication that the responsibilities of an agriculture teacher do indeed require an excessive time investment. In either case, additional research is needed to understand the job expectations and work efficiency of secondary school agriculture teachers in an effort to balance the work required with the amount of work that can be completed by agriculture teachers in a reasonable time frame.

In the second research objective, we identified a combination of work and family variables that comprised a significant model of perceived WFB ability among agriculture teachers. Specifically, the number of work hours and being married were shown to relate to significantly lower WFB ability. Our findings indicate the more hours agriculture teachers invest in their job, the lower their WFB ability. These findings are consistent with the literature indicating many of the common problems agriculture teachers face relate to excessive work hours (Chaney, 2007; Miller & Scheid, 1984; Moore & Camp, 1979; Mundt & Connors, 1999; Torres et al., 2009) and the challenge of balancing work and family responsibilities (Edwards & Briers; 1999; Mundt & Connors, 1999; Murray et al., 2011; Myers et al., 2005; Torres et al., 2009).

The conservation of resources theory describes how individuals attempt to collect and conserve resources (i.e., energy, status, and personal value) within their work and family roles (Grandey & Cropanzano, 1999; Hobfoll, 1989). Our study suggests working additional hours as an agriculture teacher and being married require additional resources in both the work and family roles.
that may limit the ability of an agriculture teacher to balance work and family. As a profession, we should explore potential options for reducing the time obligations of the agriculture teacher’s work role. This may require reducing the work expectations (e.g., paperwork, hours of FFA activities, and hours of professional development) of teachers, educating teachers on work efficiency strategies, and/or revising cultural norms regarding the measure of successful agriculture teaching. One practical recommendation for teacher educators is to showcase successful, young, practicing teachers who are working reasonable hours within teacher education programs. Additionally, we recommend training for agriculture teachers in the use of volunteers in an effort to reduce their individual workload.

Often, teachers may not actually leave the physical boundaries of the family domain to accomplish work-related activities such as planning lessons or grading student work. Similarly, family members are often able to participate in the agriculture teacher’s work roles, such as attending FFA activities after school. As a result, time resources can be shared and preserved, potentially maintaining job satisfaction (Hobfoll, 1989). The fact that number of work hours per week was a significant predictor of WFB ability suggests increasing opportunities for family members to engage in work role activities may increase WFB ability. In order for this to be realized, a family-friendly work culture must exist throughout schools coupled with professional development opportunities which encourage teachers with families to participate. We recommend research examining the work-family culture within agricultural education and how this culture influences shared time between work and family roles, as well as the relationship between work-family culture, WFB ability, and job satisfaction.

The importance of supporting the WFB ability of secondary school agriculture teachers is magnified by the findings from our third research objective in which a significant, positive relationship was identified between WFB ability and job satisfaction. These findings indicate reduced WFB ability is related to reduced satisfaction. These findings support previous research in agricultural education which has found a significant relationship between WFB ability and job satisfaction (Sorensen & McKim, 2014). Furthermore, the results support the conservation of resources theory, which links ability to balance multiple life roles with satisfaction (Grandey & Cropanzano, 1999; Hobfoll, 1989). In total, these findings reaffirm continued investigation into factors that influence WFB ability; specifically, we recommend research exploring variables which may potentially enhance the WFB ability of agriculture teachers (e.g., use of volunteers, time management strategies, work efficiency characteristics).

Within this study, respondents reported only moderate levels of WFB ability and job satisfaction, which suggests teachers may always be susceptible to attrition when time obligations shift in any life role. Research should explore how changing obligations in multiple life roles (e.g., marriage, childbirth, additional work obligations) influence teacher attrition. Additionally, research should be conducted to identify if a threshold for job dissatisfaction and/or reduced WFB ability exists, in which teachers become more likely to leave the profession.

This study sought to extend previous research on the topics of work-family balance and job satisfaction among agriculture teachers by providing data from a national sample of teachers. With continued changes in the profession as well as home and work domains throughout society, current research on the work and family interface is essential. Agricultural education is a demanding profession (Lambert et al., 2011; Lawver, 2007; Murray et al., 2011), yet the impact on students can be extraordinary. However, the demands of being an agriculture teacher appear to limit teachers’ ability to balance their work and family which, in turn, reduces their satisfaction in the profession. This is evidence of a dangerous spiral of increased work, inability to balance work and family, and job dissatisfaction. This spiral has the potential to fuel continued attrition from the agriculture teaching profession. The agriculture teaching profession must address this issue by
answering the question, how do we make the same positive impact on students while supporting the WFB ability of agriculture teachers?

References


Saving Citrus: Does the Next Generation see GM Science as a Solution?

Joy N. Rumble¹, Taylor K. Ruth², Courtney T. Owens³, Alexa J. Lamm⁴, Melissa R. Taylor⁵, and Jason D. Ellis⁶

Abstract

Citrus is one of Florida’s most prominent commodities, providing 66% of the total United States’ value for oranges. Florida’s citrus production decreased 21% in 2014 from the previous season, partly due to the disease citrus greening. The science of genetic modification (GM) is one of the most promising solutions to the problem. However, a majority of American adults believe foods produced using GM science are unsafe for consumption. This study investigated the diffusion of GM science among Millennial students in a College of Agriculture at a land-grant university and their intent to consume citrus from a tree developed with GM science. An online survey collected data about Rogers’ diffusion of innovation model characteristics and intent to consume GM citrus from 98 respondents. Relative advantage and compatibility of GM science were rated most favorably; observability was rated the lowest. The majority of respondents were likely or extremely likely to consume fruit or juice from GM trees. Compatibility was the only significant predictor of likelihood to consume GM citrus. A better demonstration of GM science’s relative advantage, compatibility, trialability, complexity and observability through formal education is needed to improve GM science adoption by Millennials.

Keywords: Genetic Modification, Citrus, Citrus Greening, Innovation, Undergraduates

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Introduction

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

Citrus greening disease (also known as Huanglongbing or HLB) is a contributing factor to the drop in Florida’s citrus production. “Citrus greening is considered to be one of the most serious citrus diseases in the world” (USDA APHIS, 2014, para. 4). Citrus greening was first found in Florida in 2005 and is now prevalent in citrus groves and residential citrus trees throughout the state (Burrow, Spann, Rogers, & Dewdney, 2014). The bacterial disease is spread by the Asian citrus psyllid and causes both the citrus tree and fruit to produce adverse symptoms such as yellowing and decreased fruit size and quality (Burrow et al., 2014; Danyluk, Spann, Rouseff, Goodrich-Schneider, & Sims, 2011). Mature trees infected with citrus greening become less productive and in some cases stop producing fruit. Young trees infected with the disease commonly die within one to two years (Brlansky, Dewdney, & Rogers, 2013). Citrus growers participate in management practices such as integrated pest management, scouting, and tree removal in an effort to control the spread of the disease, but there is no cure for citrus greening (Brlansky et al., 2013; USDA APHIS, 2014). Florida lost more than 216 million boxes of citrus, $4.54 billion in economic output, and 8,257 jobs from citrus greening from the 2006-2007 citrus season to the 2010-2011 citrus season (Hodges & Spreen, 2012). “Despite everyone’s best efforts, HLB now literally threatens the survival of Florida citrus and is a potential threat the entire U.S. citrus industry” (USDA ARS, 2016, para. 2).

The science of genetic modification (GM science) has been identified as one of the potential solutions to citrus greening (Korves, 2015; Mahgoub, 2016) and has already been used to save the papaya industry in Hawaii (Gonsalves, Ferreira, Manshardt, Fitch, & Slightom, 2000). Papaya ringspot virus (PRSV) was devastating papaya production in Hawaii, and traditional treatments were unable to stop the spread of PRSV. Genetically modified (GM) papaya was found to be a viable solution, and more than half of the papaya grown in Hawaii was GM by 2006 (Lemaux, 2008). The U.S. government has invested more than $380 million dollars in finding a solution to citrus greening (USDA, 2016), with GM science being the most promising solution to save the industry (Bove, 2012). However, consumers have not typically viewed GM science as favorable (Frewer, Scholderer, & Bredahl, 2000), which has made “… consumer acceptance of biotechnology a critical issue for stakeholders in all nations” (Irani, Sinclair, & O’Malley, 2001, p. 7). According to Funk and Rainie (2015), 57% of American adults believe foods produced using GM science are not safe for consumption, yet science has found food produced using GM science to be safe and unrelated to health issues (National Academy of Sciences, 2016; Nicolia, Manzo, Veronesi, & Rosellini, 2014).

Consumer acceptance of new technology is essential for the success of a product (MacFie, 2007). Understanding consumer perceptions of food produced using GM science provides insight to the potential acceptance and success of citrus produced through GM science. Clough (2011) stated “…knowledge, accurate or not, is what citizens use when assessing public issues involving science and technology” (p. 701). Once an individual has completed formal education, media becomes their main source of information about science and science-related topics (Nisbet et al., 2002). Therefore, it is important for educational institutions both at the secondary and post-secondary levels to educate students using an interdisciplinary approach to public issues involving science and technology, so that they are able to respond to real-world problems as they enter adulthood (DiBenedetto, Lamm, Lamm, & Myers, 2016). In addition, current undergraduate students in colleges of agriculture and life sciences will be serving as the future leaders of the
agricultural industry; therefore, their ability to address society’s changing demands (DiBenedetto et al., 2016) and understanding of science as it relates to food production practices is extremely important. Lamm, Lamm, and Strickland (2013) identified changing cultures and increased pressures on the land-grant system as challenges that need to be addressed in the classroom as agricultural educators prepare future leaders. The land-grant mission supports innovative ideas and technological advancements, while translating science and research to the public; however, little is known about how undergraduate students within colleges of agriculture and life sciences think about and make decisions regarding the use of GM science.

Adults, both young and old, have been found to have similar beliefs about the safety of GM food (Funk & Rainie, 2015). Additionally, Ruth, Gay, Rumble, and Rodriguez (2015) found that college students were generally unsure about the risks and benefits related to GM food. Most of today’s college students are part of the Millennial generation. Those in the Millennial generation were born between 1980 and 2002 (Elmore, 2010; Howe & Strauss, 2007; Payment, 2008; Taylor, & Ketter, 2010) and make up 23% of the United States’ population (American Community Survey, 2014). The Millennial generation has been identified as having more buying power than previous generations (Hais & Winograd, 2011), further extending the need to educate this generation about GM science and GM food. Additionally, research has shown that college students form attitudes about issues throughout the course of their collegiate studies (Sears, 1986), thus making them an important population to study (Goodwin, 2013). This study sought to determine if GM science has diffused among Millennial students in a college of agriculture and life sciences at a land-grant university and if they would be willing to consume citrus from a tree developed with GM science. This research directly aligns with priority two of the American Association for Agricultural Education’s National Research Agenda, which calls for research that examines adoption decisions associated with new technologies, practices, and products (Roberts, Harder, & Brashears, 2016). By further understanding the diffusion of GM science, agricultural educators can enhance educational methods that will assist undergraduate students in making informed decisions about GM science as it relates to the future of agricultural production.

Theoretical Framework

The theoretical framework for this study stems from Rogers’ diffusion of innovation theory (2003). According to Rogers (2003), an innovation is, “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (p. 12). In this study, GM science represents the innovation. Rogers described five characteristics that determine the rate of adoption for an innovation: (a) Relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability. Relative advantage is “the degree to which an innovation is perceived as being better than the idea it supersedes” (Rogers, 2003, p. 229). Compatibility pertains to how easily an individual can fit the innovation into his/her life and if the innovation is consistent with his/her values and needs (Rogers, 2003). Complexity describes how easy an innovation can be understood and used. Trialability is how the innovation can be experimented with by adopters and is positively related to rate of adoption. Lastly, observability is defined as “the degree to which the results of an innovation are visible to others” (Rogers 2003, p. 16). Higher rates of adoption are observed when relative advantage, compatibility, trialability, and observability are high and complexity is low.

Diffusion of innovation theory (Rogers, 2003) has been used extensively in agricultural education research and provides a strong foundation for diffusing an innovation such as GM science (e.g., Bowen, Stephens, Childers, Avery, & Stripling, 2013; Murphrey & Dooley, 2000; Rollins, 1993). Murphrey and Dooley (2000) recommended increasing diffusion of an innovation, in an educational setting, by using incentives to boost relative advantage; increasing compatibility by tying the innovation to “existing values, past experiences, and needs of potential adopters” (Murphrey & Dooley, 2000, p. 48); reducing complexity by focusing on less complicated...
components of the innovation and providing technical expertise for more complicated components; providing the opportunity for individuals to start the diffusion process to boost trialability; and by increasing observability through the recognition of innovation success.

Diffusion of innovation theory has also been applied to the adoption of GM food. Weick and Walchi (2002) assessed the five factors of diffusion to identify how to make GM food successful in the consumer marketplace. Environmental risks associated with growing GM food, perceived health risks, and ethical concerns were expected to negatively impact relative advantage of GM food. The researchers concluded that GM science should be compatible with United States consumers due to the culture’s ability to embrace technology and science. The complexity of GM food was determined to be high because of consumers concerns with the effects of the GM food, how it is produced, and the science involved in GM food development. Since the current societal benefits of GM food had not directly benefited the United States consumer at the time of the study, the researchers indicated that trialability of GM food was limited. When assessing observability, the researchers reflected upon Enriquez and Goldberg’s (2000) suggestion that consumers focused more on the risks of GM food because the benefits could not be directly seen by consumers. The researchers concluded that the five factors had either a neutral or negative effect on the adoption of GM food. In a similar study, Klerck and Sweeney (2007) predicted the attitudes toward GM food would have to be positive for the innovation to be viewed as having a greater relative advantage compared to other food products. Further research is necessary to understand the adoption of GM science as an innovation, particularly in a context like citrus greening where it may be one of the best possible solutions.

Purpose and Objectives

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

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

Methods

The study’s population was undergraduate students, 18 and older, enrolled in the College of Agriculture and Life Sciences at the University of Florida. The population was sampled through a convenience sample of two general education courses offered to undergraduate students in the College of Agriculture and Life Sciences at the University of Florida \(N = 175\). Both courses were focused on research and business writing. A convenience sample was suitable due to practical restraints, efficiency, and ease of access to students in the College of Agriculture and Life Sciences (McMillan & Schumacher, 2010). However, the use of a convenience sample limits the generalizability of the results (McMillan & Schumacher, 2010).

The instructors generated a list of students’ names and email addresses of those enrolled in their course. The questionnaire was administered using Qualtrics, an online survey development tool. The target population had access to the Internet, therefore an online survey instrument was
used (Dillman, Smyth, & Christian, 2014). The instructors announced the upcoming survey in their course period prior to the launch of the survey. Each student was given an identification number and emailed a personalized link to the survey. Students had one week to complete the survey, with reminders sent on day six and day seven (Dillman et al., 2014). Extra credit in the course was given for completing the survey. The incentive of extra credit presents limitations to the study as it may have caused students to complete the survey only for the extra credit, paying little attention to the questions or providing much thought to their responses. A total of 123 students responded to the survey, achieving a response rate of 70.3%. Twenty-five of the respondents were removed from the sample due to age restrictions and incomplete data, reducing the number of usable responses to 98.

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

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

The construct measuring relative advantage included eight items with an alpha reliability of $.88$. The question in the construct asked about the advantages to GM science and included statements such as, “GM science enhances the taste of food” and “GM science increases the amount of food a farmer can grow.” An index for relative advantage was created by taking the average of the items in the construct.

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

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

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

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

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

Results

Description of Respondents

Of the useable responses, 66.3% were female and 33.7% were male (see Table 1). The majority of respondents were Caucasian (85.7%), followed by Asian or Pacific Islander (10.2%), Black or African American (5.1%), and American Indian or Alaska Native (2.0%). Additionally, 18.4% considered themselves to be Hispanic, Latino, or Chicano. More than half indicated their age ranged between 21-25 years old (64.3%). When looking at college rank, most of the respondents were juniors (61.2%), followed by seniors (35.7%), and then sophomores (3.1%).

Perceived Relative Advantage, Compatibility, Complexity, Trialability, and Observability of GM Science

Respondents were asked to indicate their perceptions of the five characteristics of an innovation (Rogers, 2003) related to GM science. An index was created for relative advantage, compatibility, complexity, trialability, and observability of GM science. The mean and standard deviation for each index are in Table 2. The respondents perceived the relative advantage and compatibility of GM science to be more favorable than the trialability, complexity, and observability of GM science. However, relative advantage was the only characteristic with a score falling more than .50 above or below the mid-point of the scale.
Table 1

**Demographics**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
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<td></td>
</tr>
<tr>
<td>Female</td>
<td>65</td>
<td>66.3</td>
</tr>
<tr>
<td>Male</td>
<td>33</td>
<td>33.7</td>
</tr>
<tr>
<td><strong>Race</strong></td>
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<td></td>
</tr>
<tr>
<td>Black or African American</td>
<td>5</td>
<td>5.1</td>
</tr>
<tr>
<td>Asian or Pacific Islander</td>
<td>10</td>
<td>10.2</td>
</tr>
<tr>
<td>White/Caucasian (Non–Hispanic)</td>
<td>84</td>
<td>85.7</td>
</tr>
<tr>
<td>American Indian or Alaska Native</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>7.1</td>
</tr>
<tr>
<td><strong>Hispanic Ethnicity</strong></td>
<td>18</td>
<td>18.4</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 - 20</td>
<td>30</td>
<td>30.6</td>
</tr>
<tr>
<td>21 - 25</td>
<td>63</td>
<td>64.3</td>
</tr>
<tr>
<td>26 - 29</td>
<td>3</td>
<td>3.1</td>
</tr>
<tr>
<td>30 - 34</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>School Rank</strong></td>
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<td></td>
</tr>
<tr>
<td>Senior</td>
<td>35</td>
<td>35.7</td>
</tr>
<tr>
<td>Junior</td>
<td>60</td>
<td>61.2</td>
</tr>
<tr>
<td>Sophomore</td>
<td>3</td>
<td>3.1</td>
</tr>
</tbody>
</table>

Table 2

**Diffusion of Innovation Characteristics (N = 98)**

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Advantage</td>
<td>3.76</td>
<td>.69</td>
</tr>
<tr>
<td>Compatibility</td>
<td>3.46</td>
<td>.77</td>
</tr>
<tr>
<td>Trialability</td>
<td>3.21</td>
<td>.72</td>
</tr>
<tr>
<td>Complexity</td>
<td>2.72</td>
<td>.69</td>
</tr>
<tr>
<td>Observability</td>
<td>2.63</td>
<td>.92</td>
</tr>
</tbody>
</table>
Likelihood of Consuming Citrus Products made with GM Science

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

Table 3

<table>
<thead>
<tr>
<th>Likelihood of consuming fruit or juice from citrus grown on a GM tree (N = 98)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely Unlikely</td>
</tr>
<tr>
<td>%</td>
</tr>
<tr>
<td>Likelihood</td>
</tr>
</tbody>
</table>

Predicting Likelihood to Consume Citrus Products Developed from GM Science

A logistic regression model was run, using the dichotomous variable as the dependent variable, to determine if perceived innovation characteristics were significant predictors of likelihood to consume. The model was statistically significant ($\chi^2 = 45.59$, $p < .01$) and could account for 50% of the variance in likelihood to consume GM citrus products (pseudo-$R^2 = .50$). Compatibility was found to be a statistically significant predictor of likelihood to consume GM citrus (Table 4). This result indicated that as respondents’ perceptions of GM science being compatible with their beliefs and values increased by one unit, the odds of respondents being likely or extremely likely to consume GM citrus increased by 5.74. The remaining innovation characteristics were not significant predictors.

Table 4

<table>
<thead>
<tr>
<th>Influence of perceived GM science innovation characteristics on likelihood to consume citrus products made with GM science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>Compatibility</td>
</tr>
<tr>
<td>Relative Advantage</td>
</tr>
<tr>
<td>Trialability</td>
</tr>
<tr>
<td>Complexity</td>
</tr>
<tr>
<td>Observability</td>
</tr>
</tbody>
</table>

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

Conclusions

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

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

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

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

**Implications and Recommendations**

Consumer acceptance of GM science will be essential for the future success of the citrus industry if the technology is used to combat citrus greening disease. Even though more than half of the respondents reported they were likely or extremely likely to consume GM citrus, the citrus industry and higher education will still need to identify ways to facilitate the diffusion of GM science if they want to encourage the consumption of citrus products produced from GM trees. A
large effort should be put toward further educating college of agriculture and life sciences undergraduates about GM science since they will have large purchasing power in the future (Hais & Winogard, 2011) and will be serving as leaders within the agricultural industry (DiBenedetto et al., 2016; Lamm et al., 2013).

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

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

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

Even though relative advantage, complexity, trialability, and observability were not significant predictors of consumption of GM citrus, they are still important characteristics in Rogers’ (2003) diffusion of innovations theory. The relative advantage and complexity of GM science can be addressed through formal education classes. In classes, educators should make an effort to reduce the complexity of GM science by initially focusing on simple components of the science, similar to the recommendations of Murphrey and Dooley (2000). For example, starting with a discussion of the GM foods currently available to consumers (corn, soybeans, yellow squash, papaya, alfalfa, sugar beets, canola, potatoes, artic apples, cotton, and salmon) can spark interest and decrease cognitive dissonance. By starting with an initial discovery approach, students become interested and start asking questions. The technical expertise of GM science may be appropriate for students required or motivated to take an advanced genetics course, but for students not in those classes, reducing complexity by focusing the discussion less complicated components of the innovation is important (Murphrey & Dooley, 2000). Introductory agriculture or science classes should integrate content about GM science and GM food to expose undergraduate students to the topic early in their academic careers. Similar to the recommendation for compatibility, a forum could be used to help students interact with farmers, residents of developing nations, or consumers to see how using GM food has benefited them and increase perceptions of relative advantage.

Trialability and observability may be difficult for consumers to identify with GM food, but there are opportunities at universities for extension professionals and agricultural educators to promote these characteristics. Agricultural educators discussing GM science or GM food in their
courses should look for experiential learning opportunities to accompany their lessons to help encourage the diffusion of these topics. For example, agricultural educators may be able to allow students to try a GM food or experiment with GM science in a laboratory setting.

Observability of GM food or GM science also could be increased by having students identify food products in a grocery store that are genetically modified or by taking a field trip to an on-campus laboratory where GM science could be observed. Tasting panels and educational booths can also be present at campus and community events as well as grocery stores to educate students on what foods are and are not developed by GM science. At campus dining halls, informational posters and signs can be included to help students understand which of the foods they are eating have used GM science and why.

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

A curriculum could also be developed to teach students about citrus greening and GM science. The effects of this curriculum on diffusion as well as likelihood to consume citrus products developed from GM science could then be assessed, perhaps through a pretest-posttest design. Future research also should test message frames to determine how to best promote the adoption of GM citrus. Based on the results from this study, frames should focus on promoting compatibility with GM science. These research recommendations could be used to study other potential GM foods, which have yet to reach the market.

References


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The Impacts of a School Garden Program on Urban Middle School Youth

Dennis W. Duncan¹, Ashley Collins², Nicholas E. Fuhrman³, David Alan Knauft⁴ and David C. Berle⁵

Abstract

School gardens have been an active part of United States schools since 1890, when the first school garden was established in Roxbury, Massachusetts. Since the turn of the 20th century school gardens have greatly expanded to include inner city schools in some of the largest metropolitan areas of the country. Since the early 1990s, school gardens have continued to rise in popularity and have been incorporated into the curriculum for state departments across the US. The purpose of this study was to determine what aspect (planting, maintaining, harvesting, cooking, etc.) of an urban school garden program had the greatest positive outcome (educational, personal, etc.) on urban middle school youth. A quantitative questionnaire was used to measure the outcomes on students (n = 31) who worked in an urban school garden through the enrollment of their agriscience connections course. Data analysis indicated that the cultivation construct had the greatest positive outcome on urban middle school youth; students who had a family garden were more interested in participating in the school garden; and students greatly enjoyed the culinary aspects of school garden programs, with all construct items having at least 60% of respondents agreeing or strongly agreeing with each statement.

Keywords: Middle school youth; impacts of school gardens; agriscience; culinary

Introduction

School gardens have been used as an experiential teaching laboratory for centuries – often providing students with a designated space where plants (landscape and edible) are grown for the benefit of the students’ learning and/or consumption, and range from potted plants and raised beds to composting programs, in-ground plots, and greenhouses (Blair, 2009). According to records the first documented school garden in the US was established in Roxbury, Massachusetts in 1890 and Maria Montessori and John Dewey spoke specifically about gardening and agricultural education for youth and emphasized the practical skills gained from gardening experiences (Hayden-Smith, 2011). In the early 1900s educational leaders supported the expansion of school gardens to include rural elementary and inner city schools (Hillison, 1998) and during World Wars I and II school gardens were utilized to grow food for communities and were considered an act of patriotism (“History of Youth Gardens,” 2002, para. 2).

Since the early 1990s school gardens have risen in popularity and have been incorporated into the curriculum of state departments of education in California, Oregon, Pennsylvania, New York, Texas, and the District of Columbia to name a few. Garden curricula primarily target

¹ Dennis W. Duncan is a Professor in the Department of Agricultural Leadership, Education, and Communication, 130 Four Towers, The University of Georgia, Athens, GA 30605, dwd@uga.edu
² Ashley Collins is a Humane Educator, Dane County Humane Society, 5132 Vogas Rd, Madison, WI 53718, ash2009@uga.edu
³ Nicholas E. Fuhrman is an Associate Professor in the Department of Agricultural Leadership, Education, and Communication, 135 Four Towers, The University of Georgia, Athens, GA 30605, fuhrman@uga.edu
⁴ David Alan Knauft is a Professor Emeritus in the Department of Horticulture, 1111 Miller Plant Sciences, The University of Georgia, Athens, GA 30605, dknauft@uga.edu
⁵ David C. Berle is an Associate Professor in the Department of Horticulture, 1111 Miller Plant Sciences, The University of Georgia, Athens, GA 30605, dberle@uga.edu
elementary level students because of the ease of blending school standards and science curriculum (Blair, 2009). Turner, Sandoval, and Chaloupka (2014) discovered that gardens were most common at elementary schools in the West, followed by the Northeast and South, and were least common at schools in the Midwest. Turner, Sandoval, and Chaloupka (2014) also found that gardens were most common at urban elementary schools and least common at schools in small towns and schools in which more students were eligible for free and/or reduced-priced meals. Additionally, school gardens have been incorporated into middle and high school programming through agricultural education courses and core courses in science, math, and language arts.

School garden programs have demonstrated many benefits for students, schools, and their communities – from a kindergarten level program in the Bronx, New York developed to expose urban students to nature and encourage them to “appreciate, respect, and nurture” nature through hands-on science activities (Gopal & Pastor, 2013) to a multicultural school garden program in Australia where researchers observed that students from many different countries and backgrounds were able to share their cultures with other students and that the program offered a “sense of belonging for students newly arrived to the country” through the garden development project (Cutter-Mackenzie, 2009, p. 129). Additionally, a cadre of studies have determined that students who participated in school garden projects and other experiential-based agriculture programming demonstrated increased standardized test scores, applied science concepts to real-world experiences, improved life skills, increased their interest in eating vegetables and showed a heightened interest in nutrition education (Ballentine, 2011; Emekauwa, 2004; Gatto, Ventura, Cook, Gyllenhammer, & Davis, 2012; Graham, Deborah, Lussier, McLaughlin, & Zidenberg-Cherr, 2005; Hicks, Duncan, Womble, & Branch, 2015; Lieberman & Hoody, 1998; Morgan, Warren, Lubans, Saunders, Quick, & Collins, 2009; Quick, Morgan, Collins, Lubans, Saunders, & Warren, 2010; Ratcliffe, Merrigan, Rogers, & Goldberg, 2009; Rich, Duncan, Navarro, & Ricketts, 2009). Lastly, researchers have discovered that parents of students who participate in school garden programs are more likely to volunteer at their child’s school because they feel more comfortable approaching and interacting with school personnel (Boyer, McFarland, Zajicek, & Waliczek, 2011). Although there has been a plethora of studies in recent years, the researchers wanted to determine what aspects (planting, maintaining, harvesting, cooking, etc.) of a school garden program had the greatest, positive impact(s) on urban middle school youth in the south.

**Theoretical Framework**

Two theory bases provided the framework for this study - social cognitive theory and the theory of significant life experience.

Theorized by Bandura in the 1960’s, social cognitive theory explains how learners gain knowledge by observing others within their environments and that learning is more of a social act rather than an individual decision. The assumptions of social cognitive theory are: behavior is purposeful and driven by a goal, individuals are self-reflective, learners are able to self-regulate, and reciprocal determinism takes place (Bandura, 1986, 1997). The three factors that allow one to evaluate behavior change within social cognitive theory (reciprocal determinism) are environment, personal factors, and behavior (see Figure 1). Environment refers to the factors that impact a person’s behavior and include the physical environment (their physical surroundings) as well as social environment (the people or social situation they are in); personal factors are an individual’s self-efficacy towards a behavior; and behavior is the response that the learner receives once they have completed the desired behavior.
Social cognitive theory has been used extensively in classrooms due to its observation aspect through demonstrations and modeling (Schunk, 2012). Observational learning occurs when a learner watches the actions and outcomes of others – this enables them to determine how to complete a task or reach a goal within a similar situation (Social Cognitive Theory, 2010). Modeling occurs when a teacher (the model) demonstrates a behavior that a student is attempting to learn. The model will demonstrate the behavior and the learner will then imitate the behavior; the model then responds to the behavior enacted by the student with positive or negative reinforcement (McLeod, 2011). One may ascertain that school gardens are an excellent outdoor laboratory that provides a rich environment for student comprehension through observation and experiential learning activities and the three factors of social cognitive theory can be observed and evaluated in the school garden.

The theory of significant life experience describes the importance of an impactful experience someone had that altered his/her life choices. It has been widely accepted in the area of environmental education as a theory to support how educating children on ways to protect the environment can alter their environmentally-friendly behaviors later in life (Chawla, 2006). Chawla’s research on significant life experience focuses on why experts in the fields of environmental advocacy and education chose to pursue such a career. Chawla primarily utilized qualitative research practices (interviews and focus groups) to determine which “significant life experience… people themselves believe to have shaped their environmental attitudes and actions” (Chawla, 2006, p. 360). According to Monroe (2003) two common themes have influenced the career choices of people within environmental positions: “childhood experiences of natural areas”, and “school-based education, particularly opportunities to take action” (p. 121). Both themes directly apply to school garden programs as they are aspects of school-based education that occur in natural areas and encourage students to be active versus passive learners.

One can argue that school gardens are an excellent example of experiential learning. According to David Kolb experiential learning is “an integrative perspective on learning that combines experience, perception, cognition, and behavior” (1984, p. 21). The emphasis on learning processes as opposed to behavioral outcomes distinguishes experiential learning from idealist approaches to traditional education (Kolb, 1984). Kolb’s (1984) learning theory is represented in a four stage cycle – concrete experience, reflective observation, abstract conceptualism, and active experimentation (Figure 2).
Figure 2: Kolb’s Theory of Experiential Learning

Experiential learning is applicable to middle school education as students are at an age where curiosity and experiential learning activities greatly appeal to them. School garden curriculum offers a cadre of opportunities for students to walk through each step of an experiential learning process. For example, in a seed germination experiment a concrete experience is provided to the students by actively planting seeds followed by reflective observation - how they planted and cared for their seeds. Next, during abstract conceptualization students hypothesize what will happen if they use improper watering techniques. Lastly, the final stage - active experimentation - involves students conducting watering experiments followed by a reflective period. At the conclusion of stage four the experiential learning process recycles and students have gained new knowledge from the experience. According to McLeod (2013) effective learning occurs once someone has experienced all stages of the cycle and can move on to new experiences and begin the process again.

Purpose and Objectives

The purpose of this descriptive study was to determine what aspects (planting, maintaining, harvesting, cooking, etc.) of a school garden program had the greatest, positive impact on urban middle school youth. The objectives of this study were to: (1) identify the demographic make-up of the study participants; (2) determine if garden cultivation (propagating, planting, caring for, and harvesting) had a positive impact on urban middle school youth; and (3) determine if culinary components (food preparation and consumption of school garden produce) had a positive impact on urban middle school youth.

Methodology

Case Study School

The case study middle school (urban setting) was selected based on its extensive school garden program and the school staff and administrations willingness to participate in the study. Approximately fifty-three teachers worked at the school and 680 students grades six through eight were enrolled when the study was conducted. Forty-eight percent of students identified as African-American, 3% Asian, 12% Hispanic, 5% multi-racial, and 32% white (Annual Performance Report, 2014). Sixty-six percent of students enrolled qualified for free or reduced meals at school meaning that they live at or below the poverty line (School Information, 2011).

The school garden program is a component of the agriscience connections course, which had 232 students enrolled at the time of the study. Students were enrolled in the course for a 16-
week semester and attended class every other day. While in middle school they had the option of taking agriscience for three semesters; one semester during each grade level. The school garden program consisted of a four plot rotational (in ground planting) field, a fruit orchard, raised beds, vertical herb wall, cafeteria composting facility, greenhouse, and a small chicken coop.

After a thorough review of the literature it was determined that there were no quantitative instruments that measured the detailed aspects of school garden programs that could be utilized by the researcher; therefore, an instrument was developed. The research team followed Dillman’s (1993, 2009) suggestions on survey instrument development and recruited a panel of research faculty with extensive experience in survey design and school garden programming. The survey instrument was concise and only one-page front and back – so that it appeared short and not overly time-consuming to participants. A Likert scale was utilized as a response method to statements within each construct (cultivation and culinary) with answer options of Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), and Strongly Agree (5). Demographic items included race/ethnicity, age, grade level, and gender of participants, as well as how many semesters each student had been enrolled in the agriscience connections (semester or year-long) course and if he/she were involved in the agricultural-related extracurricular activities provided at the school.

A pilot study was conducted to determine reliability and validity of each construct and items within the instrument. The instrument was reviewed to ensure validity by a committee of research faculty with expertise in survey design and school garden programming as well as the instructor of the agriscience connections course at the case study school. The items were evaluated for language that might confuse participants, formatting errors, and content application (Dillman, 2009). The pilot group utilized was a sixth grade class (N=24) with similar race/ethnicity demographics to the research population.

The first construct (ten items) related to cultivation activities in the school garden (planting, watering, weeding, etc.) and produced a Cronbach’s Alpha reliability score of 0.74 after evaluating the data within the Statistical Package for the Social Sciences (SPSS). A reliability coefficient of 0.70 or higher is considered acceptable, so a score of 0.74 suggests a relatively high internal consistency of the construct items and scale reliability (Davis, 1971). The second construct (eight items) related to culinary activities that took place within the school garden program (cooking produce, eating from the garden, etc.) had a Cronbach’s Alpha score of 0.86 which suggests a relatively high internal consistency of the construct items and scale reliability. With Cronbach’s Alpha scores of 0.74 and 0.86 – no changes were made to the final instrument.

The research team gained approval from the University of Georgia Institutional Review Board (IRB), permission from the case study school and active parental consent to conduct the study. Even though the literature indicates that lower response and approval rates can be expected when consent forms are sent home with students versus given directly to parents (Stein, et al., 2007), time constraints and school policy restricting access to parent contact information prevented us from gaining direct contact with parents. The inability to contact parents during this study and the challenges that followed will be discussed further in the implications and recommendations section.

Parent consent forms were distributed twice to each of the 208 students to insure a statistically sound number of participants. An introductory cover letter was included with the parent consent forms in hopes to increase participation, but as seen in a study completed by Woodruff, Mayer, and Clapp (2006) introductory letters appeared to have little or no significant effect on the parents’ willingness to allow their children to participate in the study. As previously mentioned, we did not have access to parent contact information and time was limited so a follow-up with non-respondents was not conducted.
Of the 208 students who received two parent consent forms, 45 students returned the forms to the participating teacher. The 45 students were given a child assent form, as required by IRB and a survey to complete in class while a research member was present. Of the 45 students, 39 were willing to participate in the study and a total 31 returned a fully completed survey instrument resulting in a 15% response rate based on the initial 208 enrolled students. This low response rate will also be discussed further in the implications and recommendations section.

The responses for the completed questionnaires were entered into SPSS for data analysis. Cronbach’s alpha was utilized to determine internal consistency - frequencies, percentages, and means were calculated for each applicable demographic item. Frequencies, percentages, means, and standard deviations were calculated within each construct to determine which aspect(s) of the school garden program had the greatest positive impact on the participants and independent sample t-tests were conducted on bivariate demographic items to determine if any significant differences existed between the different groups based on construct scores. Additionally, one-way ANOVA tests were conducted on multivariate demographic items to determine if any significant differences existed between the different groups based on construct scores, and assumptions of the ANOVA test were verified prior to data analysis. Furthermore, these statistical tests were utilized to determine if demographic factors influenced responses within constructs. An alpha level of 0.05 was set a priori for tests of significance.

Objective One - Determine Demographics of the Study Participants.

The average age of participants was 12.25 years; 43% indicated their race as African American, 41% white, 2.6% Asian/Pacific Islander, 7.7% Hispanic, and 5.1% indicated two or more races. A majority of the students were in 6th grade (44.7%), while 28.9% were in 7th grade and 26.3% were in 8th grade. Sixty-five percent of the participants were female, 35% male. While FFA and the Sustainability Garden Corps are widely known clubs throughout the case study school, only 15.4% of students were FFA members and 20.5% was sustainability Garden Corps members. Lastly, 49% of participants indicated that they had a vegetable garden at home. A comparison of participant demographics with the total school population is provided in Table 1.

Table 1

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Sample Population (%)</th>
<th>School Population (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>43.6</td>
<td>48.0</td>
</tr>
<tr>
<td>White</td>
<td>41.0</td>
<td>32.0</td>
</tr>
<tr>
<td>Alaskan/ Native American</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Asian/ Pacific Islander</td>
<td>2.6</td>
<td>3.0</td>
</tr>
<tr>
<td>Hispanic/ Latino</td>
<td>7.7</td>
<td>12.0</td>
</tr>
<tr>
<td>Two or More Races</td>
<td>5.1</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Objective Two - Determine If Garden Cultivation (Propagating, Planting, Caring for, And Harvesting) Had A Positive Impact On Urban Middle School Youth.

To determine the true impact(s) for the garden cultivation construct means scores and percentages for each answer option (strongly disagree to strongly agree) were calculated (see Table 2). Based on percentage levels of answer choices it appears students preferred hands-on activities that involved caring for the garden – 69.2% of students agreed/strongly agreed that “Watering is
really fun,” 51.3% of students either agreed/strongly agreed with the statement “I like to watch the seeds grow into plants,” and 78.4% strongly disagreed/disagreed with the statement “I don’t like having to care for the plants” (which reveals a positive feeling towards caring for the garden). However, students did not seem to favor cultivation tasks that were considered dirty or labor intensive – 51.2% strongly disagreed/disagreed with the statement “I like to look for insects in the garden.” The summative mean of the construct was taken (after converting items four and six into positively worded items) and resulted in a mean of 34.8 ($SD=6.69$). This score will be discussed in the conclusions section.

Table 2

*Construct One – Cultivation – Responses Reported as Valid Percentages and Means*

<table>
<thead>
<tr>
<th>Construct Items</th>
<th>SD(%)</th>
<th>D(%)</th>
<th>N(%)</th>
<th>A(%)</th>
<th>SA(%)</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planting the small plants from the greenhouse is really fun</td>
<td>5.1</td>
<td>17.9</td>
<td>25.6</td>
<td>17.9</td>
<td>33.3</td>
<td>4.19</td>
</tr>
<tr>
<td>Watering is really fun</td>
<td>5.1</td>
<td>5.1</td>
<td>20.5</td>
<td>17.9</td>
<td>51.3</td>
<td>4.05</td>
</tr>
<tr>
<td>I like picking vegetables the best</td>
<td>2.7</td>
<td>8.1</td>
<td>29.7</td>
<td>18.9</td>
<td>40.5</td>
<td>3.86</td>
</tr>
<tr>
<td>I like to watch the seeds grow into plants</td>
<td>7.7</td>
<td>15.4</td>
<td>25.6</td>
<td>30.8</td>
<td>20.5</td>
<td>3.41</td>
</tr>
<tr>
<td>Sowing seeds is my favorite part of the garden</td>
<td>0.0</td>
<td>12.8</td>
<td>51.3</td>
<td>28.2</td>
<td>7.7</td>
<td>3.31</td>
</tr>
<tr>
<td>Pulling weeds is fun</td>
<td>23.1</td>
<td>17.9</td>
<td>15.4</td>
<td>28.2</td>
<td>15.4</td>
<td>2.95</td>
</tr>
<tr>
<td>I like moving compost to the garden</td>
<td>25.6</td>
<td>12.8</td>
<td>30.8</td>
<td>20.5</td>
<td>10.3</td>
<td>2.77</td>
</tr>
<tr>
<td>I like to look for insects in the garden</td>
<td>33.3</td>
<td>17.9</td>
<td>20.5</td>
<td>15.4</td>
<td>12.8</td>
<td>2.56</td>
</tr>
<tr>
<td>I don’t like digging in the soil</td>
<td>38.5</td>
<td>25.6</td>
<td>15.4</td>
<td>12.8</td>
<td>7.7</td>
<td>2.26</td>
</tr>
<tr>
<td>I don’t like having to care for the plants</td>
<td>54.1</td>
<td>24.3</td>
<td>10.8</td>
<td>8.1</td>
<td>2.7</td>
<td>1.81</td>
</tr>
</tbody>
</table>

*Note.* SD=strongly agree; SA=strongly agree; M=mean

**Significant Differences between Groups**

One-way ANOVA and independent sample t-tests were utilized to determine if significant differences existed between the impact of garden cultivation and demographic variables. Results indicated no significant differences between race/ethnicity, age, grade level, gender, number of semesters enrolled in an agriscience class, FFA membership or Sustainability Garden Corps membership (all p-values were above 0.05). However, a significant difference did exist between students who had a vegetable garden at home and those who did not ($t$-value = 2.331; $p$-value = 0.026).
Objective Three - Determine If Culinary Components (Food Preparation and Consumption of School Garden Produce) Had A Positive Impact On Urban Middle School Youth.

The final objective of the study sought to determine if culinary (food preparation and consumption of school garden produce) had a positive impact on urban middle school youth. To determine the true impact(s) for the culinary construct means scores and percentages for each answer option (strongly disagree to strongly agree) were calculated (see Table 3). Based on percentage levels it appears that students greatly enjoyed the culinary aspects of the school garden program with over 60% of respondents agreeing/strongly agreeing with each positive item. Over 84% of students agreed/strongly agreed that “Cooking in class is fun”, 69.3% agreed/strongly agreed with the statement “I like eating the vegetables from the garden”, and 61.5% of students agreed/strongly agreed with the statement “I like vegetables more now that I have worked in the school garden.” The summative mean of the construct (after converting the statement “I don’t like vegetables” to a positively worded item) resulted in a mean of 32.3 ($SD=6.6$). This score will also be discussed in the conclusions section.

Table 3

Construct Two – Culinary – Responses Reported as Valid Percentages and Means

<table>
<thead>
<tr>
<th>Construct Items</th>
<th>SD(%)</th>
<th>D(%)</th>
<th>N(%)</th>
<th>A(%)</th>
<th>SA(%)</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooking in class is fun</td>
<td>0.0</td>
<td>7.7</td>
<td>7.7</td>
<td>10.3</td>
<td>74.4</td>
<td>4.51</td>
</tr>
<tr>
<td>I like taking food home to share with my family</td>
<td>5.1</td>
<td>12.8</td>
<td>5.1</td>
<td>17.9</td>
<td>59.0</td>
<td>4.13</td>
</tr>
<tr>
<td>I like seeing what I grew in the garden bar at school</td>
<td>2.6</td>
<td>7.7</td>
<td>12.8</td>
<td>28.2</td>
<td>48.7</td>
<td>4.13</td>
</tr>
<tr>
<td>I like eating the vegetables from the garden</td>
<td>2.6</td>
<td>2.6</td>
<td>25.6</td>
<td>30.8</td>
<td>38.5</td>
<td>4.00</td>
</tr>
<tr>
<td>It is fun to eat what we grow at school</td>
<td>7.7</td>
<td>2.6</td>
<td>20.5</td>
<td>28.2</td>
<td>41.0</td>
<td>3.92</td>
</tr>
<tr>
<td>My family likes the vegetables I bring home</td>
<td>10.3</td>
<td>5.1</td>
<td>20.5</td>
<td>15.4</td>
<td>48.7</td>
<td>3.87</td>
</tr>
<tr>
<td>I like vegetables more now that I have worked in the CMS Garden</td>
<td>10.3</td>
<td>5.1</td>
<td>23.1</td>
<td>35.9</td>
<td>25.6</td>
<td>3.62</td>
</tr>
<tr>
<td>I don’t like vegetables</td>
<td>52.6</td>
<td>15.8</td>
<td>18.4</td>
<td>10.5</td>
<td>2.6</td>
<td>1.95</td>
</tr>
</tbody>
</table>

Note. SD=strongly agree; SA=strongly agree; M=mean

Significant Differences between Groups

One-way ANOVAs and independent sample t-tests were utilized to determine if significant differences existed between demographic variables and the impact(s) associated with the culinary aspect of school the garden. Results indicated no significant differences between demographic variables (all p-values were above 0.05).

Conclusions

Overall, the data revealed several positive and encouraging impacts regarding this sample of urban middle school youth in regards to the school garden program. Positive participant outcomes related to both cultivation and culinary components of the school garden program were
determined from the summative means of each construct – the cultivation construct had a summative mean of 34.8 (total summative score of 50) and the culinary construct had a summative mean of 32.3 (total summative score of 40). Though the difference in summative mean scores is relatively small, it is clear that this sample of urban youth prefer to partake in experiential learning activities related to the culinary aspects of the school garden program over growing and harvesting fruits and vegetables. The positive outcomes associated with the results of this study coincide with Quick, et al. (2010) who concluded that “The school garden as an experiential learning approach was highly valued by students, teachers, and parents alike” (p. 128). Ratcliffe, et al. (2009) found similar, positive results with urban youth – students who were involved in the school garden program could correctly identify more vegetables and had a stronger preference for consuming vegetables than students not in the program.

As previously reported there was a significant difference discovered between students who had a vegetable garden at home and those that did not. A higher mean score was calculated for students who answered “yes” to the item: “Does your family have a vegetable garden at home?” compared to the mean score for students who answered “no.” This result could be attributed to the fact they had previous gardening experience and were therefore accustomed to the labor-intensive tasks of managing a garden. This finding is tied to social cognitive theory – learners are more comfortable completing a task that they have experience in when working with others than if they are attempting something new. The summative mean scores coupled with the facts that over 50% of respondents agreed/strongly agreed with five of the ten items in the cultivation construct and over two-thirds of respondents agreed/strongly agreed with six of the eight items in the culinary construct reveals that students do enjoy and are positively impacted following their participation in the garden program – previous studies found similar results (Ballentine, 2011; Graham, et al., 2005; Ratcliffe, et al., 2009).

Implications and Recommendations

With a response rate of 15% the results of this study can’t be applied to the entire school population nor can they be compared to larger studies with similar research objectives and student demographics; however, the results do inform practice. As previously mentioned time constraints and confidentiality of the student population as defined by the County Board of Education prevented the research team from conducting a follow-up with non-respondents; therefore, controlling for non-response error is lacking.

In regards to the low response rate we believe it may be attributed to the following factors: 1. All students are required to take an agriscience course and because of this fact some of the students may not be interested in the garden program or any activity associated with the garden program; and 2. The case study school is in close proximity to a university with faculty that conduct numerous research studies annually on the school campus; therefore, parents may be disinterested in their child participating in yet another research study. With these two factors in mind it is recommended that future studies target specific groups of students (e.g., actively versus not actively involved in a garden program) so as to gain a more represented sample(s) of students. Additionally, it is highly recommended that future studies seek passive parent consent instead of active parent consent and that direct parent contact be made versus sending home consent forms with students. Passive parent consent consistently has higher response rates than active parent consent (Courser, Shamblen, Lavrakas, Collins, & Ditterline, 2009) and direct contact with parents from the researcher has shown to have a higher response rate than student delivered consent forms (Stein et al., 2007). If school systems deny access to parent contact information it is recommended that a researcher gain school administration approval to distribute consent forms to parents during a school function (school assembly, open house, parent/teacher conferences, etc.). Lastly, it is strongly recommended that the researcher distribute all consent forms to students and/or parents.
versus depending on school staff to perform the task. Of the 696 consent forms given to the school for distribution (three per student) only 464 were distributed resulting in an average of two forms per student. This poor distribution was due to school staff taking on the responsibility of distributing forms along with their other responsibilities (teaching twelve classes, advising students, managing a garden program, etc.).

We assumed that the culinary construct would have the greatest positive impact on this population of urban youth – this was confirmed by the mean scores. More research should be conducted on the culinary aspects of school garden programs to determine which activity(s) have the greatest, positive impact on students in relation to eating habits at school, food preparation at home, the desire to educate family on the benefits of eating fruits and vegetables, and overall health.

Boyer et al. (2011) discovered a positive correlation between parent volunteerism in school garden programs and their relationship with teachers and school administrators and students indicated that they enjoy working with adult volunteers. There is great value in identifying the impact(s) on families who garden together at school and home – what are unforeseen benefits of a shared experiential learning experience in the school and home garden?

References


Why Agriculture Teachers Leave: A National Examination of Turnover Intentions and Work-Family Conflict

Tyson J. Sorensen¹, Aaron J. McKim², and Jonathan J. Velez³

Abstract

Using data from a random sample of secondary school 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 turnover intentions among agriculture teachers. 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 variables of interest (i.e., work interference with family, family interference with work, and turnover intentions) were compared by gender with no statistically significant differences identified. The final objective of this study was to determine the relationship between the two work-family conflict variables and turnover intentions. The model predicted 18% of the turnover intentions among agriculture teachers. Only one of the predictor variables, work interference with family, was identified as a statistically 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.

Keywords: work-family conflict; turnover intentions; work role; family role; work-family balance

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 teacher shortage plaguing the profession for more than 40 years (Kantrovich, 2010). Research indicates solving this teacher shortage is imperative to providing all students with access to a positive learning environment (Elfers, Plecki, & Knapp, 2006). Based on the pressing need for more teachers and the importance of maintaining an effective learning environment for students, 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 emphasis on two major areas: recruitment of more teachers into the profession and retention of those teachers within the profession. While both areas are critical, we focused specifically 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 the most recent

¹ Tyson J. Sorensen is an Assistant Professor of Agricultural Education in the School of Applied Sciences, Technology and Education at Utah State University, 2300 Old Main Hill, Logan, UT 84322, tyson.sorensen@usu.edu.
² Aaron J. McKim is an Assistant Professor of Agriculture, Food, and Natural Resources Education in the Department of Community Sustainability at Michigan State University, 480 Wilson Road Room 131, East Lansing, MI 48824, amckim@msu.edu
³ Jonathan J. Velez is an Associate Professor in the Department of Agricultural Education and Agricultural Sciences at Oregon State University, 108 Strand Agriculture Hall, Corvallis, OR 97331, jonathan.velez@oregonstate.edu
supply and demand study, teacher turnover was identified as an issue in the agricultural education profession, helping to spur the teacher shortage crisis (Foster, Lawver, & Smith, 2014). In an effort to understand teacher retention, research has focused on 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 profession (Ingersoll, 2001). These findings warrant further research and 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 teaching profession. Newcomb, Betts, and Cano (1987) stated agriculture instructors complain about having more work to do than is “humanly possible” (p. 26) and Torres, Ulmer, and Aschenbrener (2008) indicated agricultural educators must meet the traditional demands of teaching as well as roles associated with the total program. The research of Torres et al., (2008) further revealed 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.

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 work expectations, family roles, and the turnover intentions of agriculture teachers. Few studies in agricultural education have addressed this topic, but none have explored the relationships between work-family conflict and turnover intentions at a national level. This study sought to address this critical gap in the literature by utilizing a national sample of agriculture teachers to explore the relationship between time-based work-family conflict and the intentions of agriculture teachers to leave the profession. As the demographics within the profession continue to shift, along with society’s work and family role expectations, the need to examine the work-family interface has never been more salient.

**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 and Beutell (1985) called this “work-family conflict” and defined it as “conflict in which the role pressures from the work and family domains are mutually incompatible in some respect” (p. 77). This theory assumes an individual’s time and energy are limited (i.e., 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 work-family conflict 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 individuals spend 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 work-family conflict 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.

![Conceptual model of WIF, FIW, and teacher turnover intentions.](image)

**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 work-family conflict 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 1970s, 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 social 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, few females in the 1970’s and 1980’s entered the agriculture teaching profession. In 1987, females comprised only five 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 work-family conflict. Both men and women experience work-family conflict; however, men and women may experience work-family conflict differently. In our study, we sought to explain the influence of gender on work-family conflict by including gender as an independent variable within our analysis of the relationship between work-family conflict 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 do work while occupying the family domain. The spillover of work and family roles has increased the potential for work-family conflict (Crouter, 1984). Educational research has largely failed to explore this phenomenon and the potential influence on teacher satisfaction and retention (Cinamon & Rich, 2005). In this study, we sought to explore work-family conflict among secondary agriculture teachers and the impact of work-family conflict on turnover intentions.

Teacher Turnover

Understanding why teachers leave 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 & Knoblech, 2006). Tippens et al. (2013) used this research to build a comprehensive model of teacher attrition in agricultural education. 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 work-family conflict and attrition. Furthermore, there are no known national studies within agricultural education exploring the relationship between work-family conflict 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 work-family conflict and turnover intentions.

**Purpose & Objectives**

The purpose of this study was to describe secondary school agriculture teachers’ work-family conflict, turnover intentions, and the relationship between work-family conflict and turnover intentions. Exploring work-family conflict and its impact on teacher turnover aligns with the National Research Agenda Priority three which calls for research into a “sufficient scientific and professional workforce” (Roberts, Harder, & Brashears, 2016, p. 9). 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 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). A total of 75 participants’ emails “bounced” leaving an accessible population of 667. Initially, a total of 264 responses were collected. Due to our interest in the potential conflict between work and family roles of agriculture teachers, it was imperative to limit respondents to those who identified as active participants in a family role. “Family” 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 (not part of a family role $n = 26$; or not agriculture teacher $n = 4$). Therefore, 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., 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 work-family conflict and the turnover intentions of agriculture teachers. Time-based work-family conflict 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 interferes 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, Lopez, & Matos, 2013). Items used in the survey instrument were identical to those used in previous studies.

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 chose 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, face validity, and overall quality. Construct reliability estimates were calculated for each construct from a pilot test of career and technical education teachers in Oregon (see Table 1). According to Nunnally and Bernstein (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

<table>
<thead>
<tr>
<th>Instrument Construct</th>
<th>Cronbach’s ( \alpha ) (Pilot)</th>
<th>Cronbach’s ( \alpha ) (Post-hoc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Interference with Family</td>
<td>.91</td>
<td>.92</td>
</tr>
<tr>
<td>Family Interference with Work</td>
<td>.80</td>
<td>.84</td>
</tr>
<tr>
<td>Turnover Intentions</td>
<td>.83</td>
<td>.88</td>
</tr>
</tbody>
</table>
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, and normality of residuals. 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 work-family conflict of agriculture teachers; specifically work interference with family and family interference with work) and 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 gender 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 WIF, FIW, and gender 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 and 59.91% were male. This was representative of the national population of agriculture teachers (43% female, 57% male; Foster et al., 2014). 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 gender, males reported slightly higher WIF ($M = 4.63$) than females ($M = 4.54$). However, there were no statistically significant differences between males and females for WIF ($p$-value = .545). Furthermore, effect size measurements indicated gender 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 gender, females reported slightly higher FIW ($M = 2.86$) than males ($M = 2.75$). However, there were no statistically significant differences between males and females for FIW ($p$-value = .422). Furthermore, effect size measurements indicated gender had a negligible effect on teachers’ FIW (Cohen’s $d = 0.10$). Teachers’ turnover intentions were assessed to accomplish research objective three. Overall, 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 gender,
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 gender had a negligible effect on teachers’ turnover intentions (Cohen’s $d = 0.04$).

Table 2

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Total ($n = 227$)</th>
<th>Female ($n = 91$)</th>
<th>Male ($n = 136$)</th>
<th>$t$</th>
<th>$p$-value</th>
<th>Cohen’s $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Interference with Family (WIF)</td>
<td>4.58 1.07</td>
<td>4.54 1.14</td>
<td>4.63 1.01</td>
<td>-0.60</td>
<td>.545</td>
<td>0.08</td>
</tr>
<tr>
<td>Family Interference with Work (FIW)</td>
<td>2.78 1.04</td>
<td>2.86 1.06</td>
<td>2.75 1.04</td>
<td>0.81</td>
<td>.422</td>
<td>0.10</td>
</tr>
<tr>
<td>Turnover Intentions</td>
<td>2.95 1.35</td>
<td>2.98 1.37</td>
<td>2.92 1.33</td>
<td>0.29</td>
<td>.774</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Note. WIF, FIW, and turnover intentions were measured on a 6-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, gender was entered into the regression analysis 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 ($\beta = .41; p$-value $= < .001$). Gender and FIW were statistically insignificant predictors in this model.

Table 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>Zero-order correlation ($r$)</th>
<th>$p$-value</th>
<th>B</th>
<th>SEB</th>
<th>$\beta$</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>.02</td>
<td>.774</td>
<td>-.10</td>
<td>.17</td>
<td>-.04</td>
<td>.538</td>
</tr>
<tr>
<td>WIF</td>
<td>.42</td>
<td>&lt;.001</td>
<td>.53</td>
<td>.08</td>
<td>.41</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>FIW</td>
<td>.08</td>
<td>.258</td>
<td>.04</td>
<td>.08</td>
<td>.03</td>
<td>.638</td>
</tr>
</tbody>
</table>

Note. $R = .42$, $R^2 = .18$, $F = 15.68$, $p$-value $< .001$. WIF, FIW, and turnover intentions were measured on a 6-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 school agriculture teachers’ work-family conflict, measured as work interference with family (WIF) and family interference with work (FIW), turnover intentions, and the relationship between work-family conflict variables and agriculture teachers’ turnover intentions. This national 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. Although various demographic data were collected, only gender was utilized in the analysis of this study. Further research should explore how other demographic variables (e.g. number of teachers, time in the profession, and age) influence WIF, FIW, and turnover intentions.

Research objective two sought to describe agriculture teachers’ work-family conflict. This construct was split into two areas, WIF and FIW, to provide additional insight into the origination and type of work-family conflict 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 agriculture teachers experience as a result of negotiating multiple life roles is a result of workplace characteristics more than 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 work-family conflict variables, WIF and FIW, were also compared between male and female agriculture teachers. Traditional gender expectations suggest women should experience more work-family conflict 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 work-family conflict challenges among female teachers (Baxter, Stephens, & Thayer-Bacon, 2011; Foster, 2001; Kelsey 2006; Murray, Flowers, Croom, & Wilson, 2011). However, our findings suggest the scope of research exploring specific work-family conflict 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, Ritz, & Burris, 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 gender does not influence teachers’ commitment to stay in the profession (Cano & Miller, 1992; Sorensen & McKim, 2014). Additionally, these findings suggest the “revolving door” or teacher 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 work-family conflict, turnover intentions, and actual 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 work-family conflict 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 work-family conflict 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 among 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. Additionally, we recommend agriculture teachers seek out and utilize volunteers and community resources in an effort to reduce WIF. These findings
also have potential implications for the blending of family with work, which might decrease WIF and FIW. More research in this area is warranted.

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 work-family conflict 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 work-family conflict 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


Impacts of an Agricultural Leadership Extension Program for County Officials

Valerie Lynn McKee¹, Summer Felton Odom², Lori L. Moore³, and Theresa Pesl Murphrey⁴

Abstract

Agricultural leadership extension programs aim to expand the horizons of leaders through study and experiences. These programs can have direct implications for communities when they are designed and delivered for county officials. This study specifically examined a leadership program administered in Texas which has graduated five classes of county commissioners and judges over the past decade, boasting 54 alumni. Given that the program had not been evaluated, this study used qualitative methodology to determine the program’s impacts on community leaders. Eleven program graduates were interviewed as well as asked to provide artifacts representing impacts of the program. Categories emerged from the data and were identified as: affective impacts, behavioral impacts, and cognitive impacts. Data revealed that the social networks and relationships participants gained was an overarching outcome of the program as these influenced the affective, behavioral, and cognitive impacts of the program. Several recommendations for further research, program modifications, and community leadership opportunities resulted from the study. Findings provide insight for those seeking to improve programming for agricultural leadership extension programs.

Keywords: Leadership; Extension; Program; Community; Evaluation; Impacts

Introduction

The goal of leadership development programs is to build leadership capacity as a measure against unforeseen challenges or developments (Kaufman, Rateau, Ellis, & Kasperbauer, 2010). Agricultural leadership development programs have the potential to initiate change and increase human capital and network resources within rural communities (Etuk, Rahe, Crandall, Sektman, & Bowman, 2013). Agricultural leadership development programs aim to expand the horizons of participants through study and experiences (Carter & Rudd, 2000). Participants of these programs are exposed to a wide range of state and national issues that are not commodity or sector-specific. Additionally, these programs give participants an overview of other related issues such as the environment, interpersonal relationships, the political system, and urban interface. While some agricultural leadership development programs are privately funded, others are mandated through state Extension organizations. According to Diem and Nikola (2005), a variety of Extension educational programs have been offered over the last 20 years with the purpose of developing agricultural and community leaders. The evaluation of agricultural leadership development programs has been of research interest to program staff and funding sources for such programs.

¹ Valerie McKee is the Leadership Programs Coordinator in the UF/IFAS Center for Leadership at the University of Florida, 101a Bryant Hall, Gainesville, FL 32611-2060, vmckee@ufl.edu
² Summer Odom is an Assistant Professor in the Department of Agricultural Leadership, Education, and Communications at Texas A&M University, 218 Agriculture and Life Sciences Bldg., 600 John Kimbrough Blvd, College Station, TX 77843-2116, summerodom@tamu.edu
³ Lori L. Moore is an Associate Professor in the Department of Agricultural Leadership, Education, and Communications at Texas A&M University, 224 Agriculture and Life Sciences Bldg., 600 John Kimbrough Blvd, College Station, TX 77843-2116, llmoore@tamu.edu
⁴ Theresa Pesl Murphrey is an Associate Professor in the Department of Agricultural Leadership, Education, and Communications at Texas A&M University, 236 Agriculture and Life Sciences Bldg., 600 John Kimbrough Blvd, College Station, TX 77843-2116, t-murphrey@tamu.edu
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(Black & Earnest, 2009; Carter & Rudd, 2000; Diem & Nikola, 2005; Russon & Reinelt, 2004; Van De Valk, 2011). However, there is a lack of research and literature related to the impacts of agricultural leadership development programs specific to community leadership (Etuk et al., 2013).

According to Hartley and Allison (2000), the movement to incorporate leadership development in local government has emerged as a way to modernize and improve public services. The government’s agenda for modernization contends for an improved role for “local authorities in leading their communities and being responsible for the social, economic and environmental well-being of the locality” (Hartley & Allison, 2000, p. 35). The Cooperative Extension Service (CES) has historically served communities by offering leadership programming to develop leaders for the contexts of public services and agricultural and natural resources (Carter & Rudd, 2000). CES organizations have the “ability to deliver needed education to producers who need it” (Sparks, 2014, para. 5), making them ideal host organizations for agricultural leadership development programs.

The Texas A&M AgriLife Extension Service created the V.G. Young Institute of County Government in 1969 to provide educational programs for Texas county officials (Texas A&M AgriLife Extension, n.d.). In 2005, the Institute developed a two-year agricultural leadership development program known as the Commissioners Court Leadership Academy (CCLA) to further enhance the professionalism, broaden the knowledge, and enrich the experience of county judges and commissioners in Texas. To participate in the CCLA program, interested county judges and commissioners must first apply (Texas A&M AgriLife Extension, n.d.). Applications are then reviewed and evaluated based on the applicant’s achievements, skills, leadership roles, education and training, personal and professional goals, and participation in professional associations. The program accepts up to 24 participants per two-year class. Throughout the two-year program period, participants commit to 16 days of educational sessions and travel time. Selected participants attend three three-day sessions, each occurring at locations throughout the state, and one seven-day session in Washington, D.C. The CCLA program provides leadership education and development for Texas county commissioners and judges. The CCLA program has graduated five classes of participants and boasts 54 alumni. However, there had not been a formal evaluation of the program itself or the impacts of the program on graduates. As an agricultural leadership development program provided by Texas A&M AgriLife Extension, the CCLA program has implications for changes in county governments and communities across the state of Texas. Moreover, there is a gap in the literature concerning the evaluation of agricultural leadership programs addressing specific contexts such as local government.

The purpose of this study was to identify the impacts and outcomes of the CCLA program on its graduates. The research question was as follows: What are the impacts and outcomes of the CCLA program? This study was substantiated by Research Priority Six of the American Association for Agricultural Education National Research Agenda (Roberts, Harder, & Brashears, 2016). This research priority articulates the role that vibrant and resilient communities play in the success of students and academic endeavors. The development of vibrant and resilient communities requires that local citizens be provided with opportunities to develop leadership skills and apply them through implementing real change in their communities. Just as education is “critical to a resilient community to increase knowledge, improve practices, and influence behaviors,” (Roberts et al., 2016, p. 51) the education provided by the CCLA program can help to build resiliency within communities through the understood impacts and outcomes of the program.

**Literature Review**

The need for evaluation of CES programs was substantiated by the passing of the Government Performance Results Act (GPRA) in 1993 and the Agricultural Research, Extension, and Education Reform Act (AREERA) in 1998 (Lamm, Carter, & Lamm, 2016). The ability to
accurately evaluate and articulate the outcomes of CES programs is critical to the continuation of support for such programs. Unfortunately, comprehensive evaluations of leadership development programs can be challenging to conduct (Black & Earnest, 2009).

Lamm, Carter, and Lamm (2016) reported the results of an evaluation of eight agricultural leadership development programs administered by CES within the southern region of the United States. Survey questionnaire methods were used to collect data from 960 completed questionnaires, offering an overall response rate of 54%. Demographics of the participants were determined from the collected survey data; the average participant was male (74%), white (92%), and in their late thirties at graduation ($M = 38.61$, $SD = 8.37$). Using Bandura’s (1977) Social Learning Theory and Kirkpatrick’s (1994) four-level evaluation model for training programs as a framework for the evaluation, it was found that participants were very satisfied with their program experience and thus, the learning environment met their needs. It was also found that program participants have held a large number of leadership roles within their communities and industries, with a total of 2,778 leadership roles reported and 46% of the participants serving in leadership positions upon completion of their program experience.

Many leadership development programs assert that participants’ personal and professional networks are enhanced as a result of their participation (Van De Valk & Constas, 2011). Social capital is defined as “features of social organization such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit” (Putnam, 1995, p. 67). However, sufficient research is not available to support a causal relationship between leadership development programs and social capital (Shadish, Cook, & Campbell, 2002; Van De Valk & Constas, 2011). Van De Valk (2008) noted that while networking is often cited as a benefit of participating in leadership development programs and is an important step in enhancing social capital, research is still needed to better understand the dynamic relationship between social capital and leadership. According to Gopee (2002), social capital is important in learning because it is the main process by which adults learn in the context of organizations. Terroin (2006) found social capital to be beneficial to program success in several ways. The participants’ social networks formed as a result of the program helped to ensure their continuous, informal learning through ongoing interaction with their peers. Social capital as a result of programming was also found to enhance participants’ sense of belonging and bonding.

**Conceptual Framework**

The conceptual framework for this study was based on Merriam and Caffarella’s (1999) five orientations to learning: behaviorism, cognitive orientation, humanist orientation, social learning, and constructivism. Each of these orientations are described for the purpose of establishing a foundation for the study’s conceptual framework. Because this study was focused on the reported impacts and outcomes of a leadership development program, the researchers were interested in what the participants said they learned from the program and how they learned what they learned.

The behaviorist orientation of learning assumes the following: learning is observable through changes in behavior; the learned behavior is determined and shaped by the environment and its elements and not by the individual learner; and the principles of contiguity, or how close in time two events must be to be connected, and reinforcement, or any means of increasing the odds of an event to happen again, are crucial to explaining the learning process. The behaviorist learning process is manifested through behavioral objectives, competency-based education, and skill development and training (Grippin & Peters, 1984).

The cognitive process includes insight, information processing, memory, and perception (Merriam & Caffarella, 1999). From this perspective, education is designed to develop one’s
capacity and skills to learn better, and the educator is responsible for structuring the content to be learned. Cognitivism is manifested in adult learning through cognitive development, learning how to learn, and intelligence, learning, and memory as a function of age.

Merriam and Caffarella (1999) describe social learning theory as combining elements of behaviorism and cognitivist orientations. Bandura’s (1986) work on social learning theory accounts for both the learner and the environment as interacting parts to learning; behavior is influenced by the environment, which is influenced by people. The learning process is a result of the interaction with and observation of others in a social context (Merriam & Caffarella, 1999). Social learning is manifested in adult learning through socialization, social roles, and mentoring.

Humanist theorists (i.e., Rogers (1983) and Maslow (1970)) assert that people control their own destiny, are inherently good and seek to make the world better, are free to act and behave as they choose, and possess unlimited potential for growth and development. The humanist orientation to learning sees the process of learning as a personal act to fulfill one’s potential. Both affective and cognitive needs drive this process as the learner seeks to become self-actualized and autonomous. The humanist approach is manifested in adult learning through andragogy and self-directed learning.

The constructivist maintains the belief that “learning is a process of constructing meaning; it is how people make sense of their experience” (Merriam & Caffarella, 1999, p. 261). The constructed meaning is made by the learner and is dependent on the learner’s past and present knowledge structure. Learning is therefore a result of the learner’s internal construction of reality. Constructivism can be manifested in adult learning in the form of experiential learning, self-directed learning, perspective transformation, and reflective practice.

Beyond the five orientations to learning described by Merriam and Caffarella (1999) are other learning theories that offer understanding for how individuals are motivated to learn. Maslow’s (1970) hierarchy of needs provides a pyramid model for motivation factors that can apply to learning. According to Maslow (1970), individuals are motivated by unmet needs from the lowest level of the pyramid model. From a learning perspective, this looks like an individual who is unmotivated to learn based on what needs are not being met. For example, if the individual has his or her physiological and safety needs met but lacks a sense of belonging, then he or she may be most motivated to learn at this level of Maslow’s (1970) model.

According to Argyris and Schon (1974), all human action is based on theories of action. Espoused theories of action are those that are reported as a basis for one’s actions (Argyris, 1976). Theories-in-use are the theories of action concluded from how people actually behave, including any relatively or directly observable behaviors. According to the behavioral findings of Argyris (1976), “most individuals studied seem to be able to detect the discrepancies between their espoused theories and theories-in-use of others, but were not able to detect similar discrepancies in themselves” (p. 367). Learning eventually results in changes of action and not just the taking in of new information and formation of new ideas (Senge, 1992). According to Senge, gaps between espoused theories and theories-in-use should not cause discouragement as they can arise as a consequence of vision. Senge asserts the recognition of the gap between espoused theories and theories-in-use is the first step in learning. Furthermore, if an individual does not value the espoused theory as part of his or her vision, then there is no real tension between the person’s reality and vision.

Methodology

Qualitative research involves studying people or things in a natural environment in order to better understand their meaning (Merriam, 2009). Until recently, qualitative studies on leadership were considered relatively rare (Klenke, 2008). According to Geertz (1973), qualitative
research methods add value to the study of leadership because they provide rich, thick description of phenomena, which helps in the capture of multiple views and voices. Also, qualitative methods in leadership studies offer ways to explore symbolic dimensions (Morgan & Smircich, 1980). A qualitative research design was chosen for this study because it allowed for special attention to be given to the exploration of program graduates’ opinions, beliefs, and experiences.

The target population for this study was the graduates of the CCLA program from 2005 to 2015. We used typical purposeful sampling (Merriam, 2009) and maximum variation of the subjects was sought through a process of selection based on graduates’ CCLA class number, class size, gender, geographic location, and position held in their respective counties. At the time of the study, the CCLA program had graduated approximately 54 participants since its formation. Within each two-year class, the number of graduates varied depending on the year and the number of applicants. We contacted participants of the study for their consent using an IRB approved email protocol.

According to Patton (2002), maximum variation sampling is ideal for diversifying your sample population to “avoid one-sidedness of representation of the topic” (p. 109). To purposefully select participants for the study with maximum variation in mind, we developed a system for selection. First, we reviewed a list of graduate names printed in order of class number; the names within each class were listed in alphabetical order by the county he or she represented. We pre-determined a number of class members to contact initially based on the total number of members in each class. Classes one, two, and three graduated seven, 10, and seven participants, respectively. We chose to initially contact three members of each of these classes to participate in the study. Classes four and five graduated 17 and 14 members, respectively. Four members of each of these classes were chosen initially to participate in the study. Then, because of the significantly low number of female graduates listed, at least half of the number of females in each of the classes were selected to be contacted initially for participation in the study. Finally, the differentiation of regional representation, as outlined by the Regional Associations of County Judges and Commissioners (Texas A&M AgriLife Extension, n.d.), was determined as a factor for the selection of participants to initially contact to be in the study. Using the initial criteria of class number, class size, gender, and regional representation, the top of the list of names for each class was used to select participants to contact for the study. Of the initial 17 graduates contacted by email to request participation in the study, eight graduates responded, seven of whom agreed to participate.

For the second attempt to contact graduates of the program, we used similar criteria for selection; however, in the second attempt, four graduate names were selected to contact from classes one and two. Also, attention was paid to whether the graduate represented a county that had not yet been represented by those graduates who were initially contacted and agreed to participate in the study; this rule was ignored if the graduate was female. Some graduates were also passed over in the second selection process based on their regional and county location; we wanted to purposefully contact graduates from across the state and as equally as possible by region. Of the 19 graduates contacted for study participation, four graduates responded and agreed to participate in the study and were interviewed. After completing interviews with the 11 total graduates who agreed to participate in the study (i.e., seven from the first attempt and four from the second attempt), no other graduates were contacted due to data saturation (Merriam, 2009).

The 11 participants of this study represented all five graduated classes of the program. Three participants represented class I. Three participants represented class II. One participant represented class III. Three participants represented class IV. One participant represented class V. There were three female participants and eight male participants. Four of the participants were currently serving as county judges, and seven of the participants were currently serving as county commissioners. Participants were serving in counties located in southeast Texas, central Texas, northwest Texas, and west Texas.
For this study, data collection consisted of interviews and the collection of documents and records. An interview is considered to be “a conversation with a purpose” (Lincoln & Guba, 1985, p. 268). Through interviews, a researcher may obtain information about the subject’s experiences including their feelings, concerns, questions, and motivations. An interview also allows the researcher to ask for clarification on the interpretation of other sources, which may include documents, records, and earlier interviews (Lincoln & Guba, 1985). A semi-structured interview protocol was developed to learn from graduates of the CCLA program about their perceptions and opinions regarding the impacts of the program, the strengths and weaknesses of the program, and future engagement with the program. The interview questions were open-ended with the intention of collecting data in the following areas: impacts of the program on graduates’ personal lives, impacts of the program on graduates’ leadership, impacts of the program on graduates’ careers, the level of desired future engagement in the program, and recommendations for future opportunities to engage graduates in the program. It should be noted that this study was part of a larger study and thus the interview questions were written to address more than one research question. The semi-structured interview questions asked to all participants of this study were as follows:

1. Why did you choose to apply for the CCLA program?
2. What do you think were the objectives of the program?
3. What do you think were the strengths and weaknesses of the program?
4. What were your personal takeaways and impacts from going through the program?
5. If another opportunity to engage somehow in the program was offered for you as a graduate, would you want to be a part of it? If so, what kind(s) of opportunities would you want offered to you as a graduate of the program?

In-person interviews were conducted with three of the selected participants, while phone interviews were conducted with the other 8 participants. The interviews lasted no longer than 90 minutes. Field notes were used to document the interviews. We used “empathic neutrality and mindfulness” as a fieldwork strategy when interviewing the participants (Patton, 2002, p. 40). This strategy is defined as having “an empathic stance in interviewing” and “understanding without judgment (neutrality) by showing openness, sensitivity, respect, awareness, and responsiveness” (Patton, 2002, p. 40). Participants were also asked to share any documents and/or records which could pertain to examples of the impacts of the CCLA program. Documents and records are another source of data that added value to the study. These pieces of information served as proof of past experiences. We were responsible for gaining proper permission to view any documents and records (Lincoln & Guba, 1985). The examples of documents and records that we collected from the participants in this study included emails, correspondences with constituents, awards, written articles, and other items demonstrating the impact of the CCLA program.

Upon completion of each interview, the handwritten field notes were typed and first organized according to the interview question. Participants were assigned a random number; these numbers were used to code the participants’ responses in the notes. The interview questions served as initial categories; however, the responses provided were organized under multiple questions depending on what was said and whether it was relevant to answering the question category. Thus, the response to one question could have been organized so as to fall under multiple categories so as to provide as much data as possible for theme analysis. Responses in each category were analyzed using the constant comparative analysis strategy to identify emerging themes (Merriam, 2009). Through this method, smaller categories of data were formed as we recognized similarities and differences in the data. We continued in this process until clear thematic patterns emerged in the smaller categories that were agreed upon by all of the researchers involved in this study.
Study Trustworthiness

According to Lincoln and Guba (1985), the appropriate criteria for the trustworthiness of the naturalistic paradigm include credibility, transferability, dependability, and confirmability. This study confirmed credibility of the data collected through the use of triangulation in the data interpretation process. First, multiple sources of data allowed for triangulation of the sources as the data collected came from people with different perspectives (Merriam, 2009). Also, “methods triangulation” occurred through the use of different methods of data collection, including interviews and documents (Patton, 2002, p. 556). Second, peer debriefs, also known as analyst triangulation, helped with overseeing the data analysis so as to triangulate the interpretation of the data through independent perspectives (Merriam, 2009; Patton, 2002). We performed “theory/perspective triangulation” by using multiple perspectives or theories to interpret the data (Patton, 2002, p. 556).

This study also assured trustworthiness through respondent validation, or member checking. We solicited feedback on data interpretations by taking the preliminary analysis of the data collected and sending it back to the participants in the study for their confirmation. Furthermore, maximum variation of the sample selected to use in this study ensured a greater chance of data trustworthiness. Rich, thick descriptions of the findings provided readers with context to understand the transferability of the study to their current situations. Lastly, audit trails were used to examine the data process and establish dependability and confirmability in the study (Lincoln & Guba, 1985). Audit trail categories used in this study include raw data, process notes, data reconstruction and synthesis products (including created themes and categories), and the study’s research design.

Findings

The purpose of this study was to identify the impacts and outcomes of the CCLA program. The following thematic categories emerged from the data: Affective Impacts, Behavioral Impacts, Cognitive Impacts, and Overarching Impact: Networking and Relationships. “Affective Impacts” were described as those outcomes reported by participants that showed changes or emphasis in participants’ emotions and outlook from completing the program. “Behavioral Impacts” were defined as the outcomes reported by participants that demonstrated changes in participants’ behaviors after completing the program. “Cognitive Impacts” were defined as those outcomes reported by participants who indicated participants’ new knowledge or understanding upon program completion. The “Overarching Impact: Networking and Relationships” was described as those outcomes reported by participants who have influence on the other three categories of impacts because of the participants’ reported formed networks and relationships from the program.

Affective Impacts

It was evident that participants’ reported enthusiasm for the academy was an affective outcome of the program. Participants conveyed many positive emotions about the program. Participant P1 said that upon graduating from the program, both she and her classmates “had this energy to use what tools [they] had been given and seek more.” Participant P2 said to the interviewer about her positive remarks of the program, “There’s nothing I haven’t told you that I haven’t told 20,000 people.” Both participants P4 and P7 expressed the importance of the academy and its need to continue to provide education for future county commissioners and judges. Participant P7 recognized Texas A&M’s role in the academy and appreciated “the university for providing” it. Participant P6 said, “I am passionate about [CCLA] because I believe in it.” Participant P9 said he couldn’t “say enough good things” about the academy.

A reported change in participants’ confidence levels was another clear affective outcome from program participation. Participant P1 expressed that she is now “more comfortable expressing
[her] issues and concerns” in the context of her job. Participant P5 made several statements regarding the confidence he gained from the academy. Participant P5 said, “[The academy] helped build my confidence as a speaker and a leader—especially with working with three levels of government...I now ask more of the not-so-obvious questions. I don’t take things at the surface. I sometimes play the devil’s advocate.” Participant P7 shared a story about gaining the confidence to skydive after going through the program:

During our academy [class], I made a comment during a social hour that one of the things I always wanted to do was skydive. [A fellow classmate] said she had done a tandem jump and that we should do that after graduation from the academy. So, the day after graduation, we played golf in the morning and then a small group of us met at [location] Skydive and jumped. Leadership Academy and skydiving, two great experiences, and I treasure them both. (P7)

As a reported affective outcome of the program, all 11 participants conveyed a desire to be engaged in the program in the future if the opportunity was made available. As one form of future engagement, participants expressed desire to volunteer and serve future classes (P3, P4, P5, P6, P8, P9, P10, & P11). Several of the participants expressed interest in volunteering as speakers for program sessions (P3, P6, P9, P10, & P11). Participant P3 said, “I’ve got 20 years of experience and I’d be willing to share that on a range of topics.” Some concerns were expressed in accompaniment with participants’ desire to be a part of the program in the future. Participant P11 voiced that he thought “older folks should come out and visit with the new class...maybe through some sort of meeting maybe at the conferences once or twice a year” in order to “talk to the new folks.” Participants P1, P4, and P6 all discussed time and feasibility as factors in their future involvement with the program. Participant P4 said about volunteering in the program, “All of us like to serve in some capacity, but do we have time? I have the time, but others may not.” Similarly, participant P6 said, “If I was 35-40 years old, I’d seek much more involvement...My involvement is limited because of my age and time in office.”

Participants also expressed interest in follow-up or next-level program opportunities for those who have been through the academy (P1, P2, P4, P5, P7, & P11). As participant P5 stated, “This is a great program, but it leaves you thirsty for more.” Participant P2 said, “Within a heartbeat, I’d participate in another program.” Participant P4 compared the benefits of going through a second level of the program to those of someone with a bachelor’s degree who wants to continue in a master’s program. Participant P7 said she “would be pleased to do another round of the leadership academy—an advanced program maybe...that [would] touch on [her] ability to work with others.” Likewise, participant P11 thought team-building exercises would be great for the focus of a second-level program course. Ideas for another part of the program for graduates included “a follow-up annual event or class or conference” (P1), an “inspirational speech” (P5), a “two-day event” with a focus on problem-solving or “something hands-on” (P5), or an additional piece to one of the other Texas county conferences (P5). Participant P11 conveyed that a “follow-up” is needed for recent class graduates to be asked “How are you doing?” and “How are you using what you learned?”

The participants also described the idea of a program reunion as a form of future engagement in the academy (P4, P6, P8, P10, & P11). Participant P6 said, “One thing I have talked about with my classmates is that we wish there were more alumni type meetings...not only to reminisce but also to stay connected more and continue to be a part of the program.” Similarly, participant P8 remarked that she “would love to see reunions happen for the classes to mix and mingle again.” Participant P11 expressed he would love to see his fellow classmates in a relaxed setting, saying “You know, you’re meeting folks in a pretty intense time frame, folks of different counties. We go to all these meetings and see each other. We need the opportunity to spend time
Participant P4 said he thought a reunion for the program could easily be incorporated as part of one of the association conferences.

Participant P9 conveyed that the academy helped him gain “an appreciation for our country and government.” In regards to this new appreciation he said: “You know we hear the news and watch the news—we’re quick to judge national issues—but having gone to DC and seeing what goes on—but having walked through Arlington Cemetery and seeing those who have died for our country [while in DC with the program]—we know people are free to express different opinions, and our country is big enough for those different opinions” (P9).

**Behavioral Impacts**

Participants reported having sought out and received other leadership positions as a result of going through the program. Participant P1 said, “Since the class, I’ve taken on even more leadership roles.” Two of the leadership roles that participant P1 said she received “because of the program” was the State Affairs-Vice Chair and Secretary of Election & Credentials for the Texas Silver-Haired Legislature. Since graduating from the academy, participant P4 now works “a lot with the West Texas association and state association.” Participant P5 credits the academy for providing him with the leadership and confidence to “throw his hat in the running” for a county association officer position at the state level. He also mentioned that serving “as the president in 2012-2013 for the West Texas Association” (P5) was a result of going through the program. Upon graduating from the academy, participant P6 said he has served as a leading officer for four different associations tied to county government as well as in other leadership positions outside of government. Participant P11 said, “I’ve seen the growth of other commissioners who were new to [county government] when they entered the Academy and have now went [sic] on to become presidents of our associations and have really gotten involved.”

Participants testified to having worked better with others since going through the program (P1, P2, P4, P7, P8, P9, & P10). Participant P2 said that what she learned from the academy has helped her as she has dealt with constituents. Participant P2 conveyed that halfway through her program experience she was able to begin using what she learned about relationships to “deal with other members of the court.” She said about her fellow court members, “If I hadn’t went [sic] through the course, we would have killed each other” (P2). Participant P10 said he learned how to “show [court members] the benefits [to his point]” and “get their ground.” Participant P8 still keeps her academy notebook intact to refer back to notes on a “fairly regular basis.” She conveyed that she has used her notes to look up information about dealing with different personality types (P8). Participant P9 said that because of the program he is now able to communicate and work with others who see things differently than him. He also conveyed that he learned how to “be more patient in working through problems” and to “not getting red-faced but staying calm” from the program.

Participant P10 recalled a story about “a confrontation with a constituent” in which an article was written about himself by the constituent and printed in the county newspaper. Participant P10 conveyed that he “took that [article written about him] to [his academy] class and asked them how they would respond.” Participant P10 also explained that this took place during his campaign for his second term. He said his classmates were able to give him advice on how he should respond and proceed.

Since completing the program, participants expressed a change in their interview skills (P1, P2, P7, P8, P9, & P10). Participant P1 said the program made her “more conscientious of [her] statements.” “I strive to speak with clarity because I now know how important it is to speaking with professionals” (P1). Participant P9 told a story about being interviewed previously. He said he was able to stay focused because of his focus on the notes from the academy session “even
though the interviewer kept trying to get [him] off track.” Participant P9 said, “That class really helped me with getting my thoughts together and to stay focused…Every time I’m interviewed I go back to my core statements on public service and public safety.” Participant P10 told a similar story, saying, “We’ve had some issues in our county where I had to be interviewed… [Because of the academy] I learned some tools to deal with the media.” Participant P10 conveyed that he has “reflected back” on notes from the academy to help him with interviews. “The handouts we received [from the program] were beneficial. The media training handouts I’ve referred back to for guidelines in writing articles” (P10).

As an artifact representing the impacts of the media training session, participant P9 gave the interviewer a web link to an interview that was conducted and aired after he completed the CCLA program. He said the following about the interview:

The reporter wanted to interview me on why [county] spent almost $600,000 in association dues. I knew that this could be a tough interview, so I reflected on [the CCLA program’s session on] media training and developed my “Key Message” before he arrived. Before the camera was turned on, I explained in detail that we had only spent $127,000 in association dues, not $600,000. The reporter then shifted to the real reason he wanted to talk to me on camera…tax funded Lobbyist. He grilled me for 45 minutes on the subject and it was by far, the most difficult interview that I have ever had. I was not prepared for this line of questions, but I continued to try and remain focused. Thirty minutes into the interview, the reporter actually became angry with my responses to his questions because I would not deviate from my key message. Although I am not pleased with the outcome, it could have been much worse had I not had the media training that VG Young provided in the Leadership Academy. (P9)

Participants testified to having encouraged other county commissioners and judges to apply for the CCLA program (P4, P5, P6, P7, P8, & P9). Participant P5 conveyed that he has encouraged a fellow county court member to apply for the program. Participant P6 has also encouraged others to go through the academy. Participant P6 conveyed the knowledge that the academy does not always have full classes. “The CCLA should have a waiting line… people should have a desire to grow in their leadership and grow professionally” (P6). Participant P6 also said he has worked on the obtainment of scholarship funding to help members of his county association pay for the program registration. Participant P7 recommended the program to his brother, who serves as a county commissioner in another county and is now in the current class of the academy.

**Cognitive Impacts**

As a result of going through the program, participants reported several cognitive impacts, including an increased knowledge of government at the county, state, and federal levels (P2, P4, P5, P7, P9, P10, & P11). Participant P5 said the academy taught him things about “how the dominos fall from the top down” in regards to how “legislature’s actions” lead to “reactions in the county.” Meeting different legislators through the academy was described as educational for how to be involved at the state level (P10).

Just as participants reported behavioral impacts from the program including working with others more efficiently, participants also expressed an increased cognitive knowledge of personalities and relationships (P1, P2, P4, P7, P8, P9, P10, & P11). Participant P2 said the lessons on personalities “allowed [her] to see the others in the program, and to see other commissioners.” Similarly, participant P11 said the lessons on personalities helped him work better with others serving with him on the commissioner’s court. Participant P10 said he learned about “conflict management” from the academy. “You need [conflict management] in the commissioner’s job
because you deal with conflict a lot… You’re working with other commissioners on the court and you have to work through differences of opinion” (P10). Participants described many cognitive lessons about relationships and personalities as from the program session with the horse whisperer. Participant P2 said she learned about body language from the horse whisperer. Participant P4 said the horse whisperer session taught him “how we can relate to different perspectives and relate to different constituents.” Similarly, participant P6 found the horse whisperer session to be interesting and beneficial, saying “It really brought out the aspect of dealing with different personalities [and] how we have to lead different people in different ways. “[The horse whisperer session] really focused us on how to see the differences in people.” Participant P8 said she “learned so much” from the horse whisperer session “You learn when to pick your battles, when to apply patience, when to apply pressure... It taught you how to bring out the strengths of others and not harp on the weaknesses” (P8).

Overarching Impacts: Networking and Relationships

Many participants expressed an increase in their network of relationships as a positive outcome of the program (P1, P2, P4, P5, P6, P7, P8, P9, P10, & P11). This reported outcome was recognized as an overarching theme that influenced the affective, behavioral, and cognitive impacts identified in this study. Participant P1 said she gained a “lifelong engagement with other counties.” She said, “When I go to conferences, I feel like I got big brothers watching out for me” (P1). A fellow classmate from the program gave participant P1 a wreath that hangs in her office currently. “The friendships we made from the program are still going on [today],” said participant P2. According to participant P6, there is “the circle of people you work with” and “to be able to grow you have to expand your circle of influence.” Participant P6 called upon friends from the program when he ran for office again. “The building of relationships and a network is important… There’s no way to quantify it… Life itself is based on relationships,” said participant P6.

Participant P7 said he still talks to his classmates about his “personal life” and “county life.” “The individuals I went through the Academy with are very special to me… We formed a special bond,” said participant P7. Participant P8 remains “very close to [her] classmates,” calling them regularly to ask about their perspectives. She thinks this is “one of the things that has made [the academy] so rewarding” (P8). “The networking was the most valuable part of the academy,” said participant P8. When participant P9 was charged with putting together a panel for a V.G. Young conference, he “called upon some of [his] classmates to serve on the panel.” Participant P10 said, “I got to know other commissioners [through the academy] … It’s like a homecoming every time we meet!” Participant P10 told a story about calling upon a fellow classmate who had experience dealing with “unit road systems” in her county. He said, “Her perspective was very helpful” when the same road system was implemented in his county during his second term.

Conclusions

The purpose of this study was to identify the impacts of the CCLA program on its graduates. This study was limited by its reach and application given that the study focused solely on one Extension-based leadership development program for public servants in the state of Texas. Though this study is not generalizable to other populations, the findings do provide insight as to how participants describe a specific leadership development program and its outcomes. These participant descriptions could be of value to those conducting similar programs. The impacts of the CCLA program were described in four ways: affective impacts, behavioral impacts, cognitive impacts, and an overarching impact of networking and relationships. The program impacts demonstrate the presented review of adult learning and leadership development theories.

Affective impacts were described as those outcomes that showed changes or emphasis in participants’ emotions and outlook from completing the program. The affective impacts reported
by participants were: greater enthusiasm for the program, an increase in confidence, and a desire for future engagement in the academy. Participants described future engagement possibilities to include volunteering to serve the program, learning more from the program in a follow-up or second-level course, or attending a reunion for the program’s graduates. The affective impacts reported by participants align with the humanist orientation to learning (Merriam & Caffarella, 1999). Internal changes in attitudes, beliefs, and self-perception can all be a part of one’s development as a whole person. Participants’ descriptions of future engagement possibilities also resemble actions associated with the three highest levels of Maslow’s (1970) hierarchy of needs: belonging, esteem, and self-actualization. For example, participants’ desire to engage in reunions with graduates demonstrates their motivation to belong with their fellow classmates. Participants’ desire to engage in higher levels of learning in the program may represent their motivation for esteem in their knowledge. Also, participants’ desire to engage in service could be linked to their self-actualization as servant leaders in their communities and in the program.

Behavioral impacts were described as outcomes that demonstrated changes in participants’ behaviors after completing the program. The behavioral impacts reported by participants included: having sought out and received other leadership positions, working more efficiently with others, better interview skills, and having encouraged others to apply for the program. The behavioral impacts reported by participants closely align with the behaviorist orientation to learning (Merriam & Caffarella, 1999). The identified behavioral impacts are all observable manifestations of what was learned from the program. Also, the behavioral impacts are outcomes that were reported to have reoccurred since the program and can be repeated in the future, thereby reinforcing the behavioral learning. The reported changes in participants’ behaviors are an indication of the program’s external role in participants’ learning processes.

Cognitive impacts were described as those outcomes that indicated participants’ new knowledge or understanding upon completing the program. The cognitive impacts reported by participants were: a better understanding of government at all levels and a greater understanding of different personalities. The cognitive impacts reported by participants closely align with the cognitive orientation to learning (Merriam & Caffarella, 1999). The identified cognitive impacts required participants to process, remember, and perceive information provided by the program. These actions are all characteristic of cognitive learning.

The discussion of the differences and relationship between espoused theories of action and theories-in-use (Argyris, 1976; Argyris & Schon, 1974; Senge, 1992) helps with understanding the possible relationship between the reported affective, behavioral, and cognitive impacts of the CCLA program. Whereas the affective and cognitive impacts that participants reported can be understood as espoused theories of action, the behavioral impacts of the study can be understood as theories-in-use. For example, participants’ reported cognitive program impact of understanding personalities may have influenced participants’ reported behavioral program impact of working with others better. Likewise, participants’ reported affective program impact of increased confidence may have influenced participants’ reported behavioral program impact of seeking and receiving other leadership positions.

The findings also reflect the emergence of an overarching impact of the program that influences the affective, behavioral, and cognitive impacts of the program. Participants richly described the impact of a gained network of relationships as a result of participating in the academy. This network was described as beneficial to both the participants’ careers and personal lives. This finding aligns with the social learning orientation to learning (Merriam & Caffarella, 1999). It is also an overarching impact that supports what is understood about social capital as an outcome of leadership development programming (Terroin, 2006; Van De Valk & Constas, 2011). Although Van De Valk and Constas (2011) were unable to establish a causal relationship between leadership development programs and social capital, Van De Valk (2008) recognized the importance of social
capital as it pertained to the purposes of adult leadership development programs. The gained social network reported as an overarching impact has implications for leadership growth and learning beyond the CCLA program. Terroin’s (2006) conclusions about the impact of social capital on individuals who have completed leadership programs support this identified and overarching impact.

### Recommendations for Further Research

The findings of this study serve as a foundation for future studies focused on the evaluation of agricultural leadership programs. In fact, several new research questions emerged from study findings. One question that emerged from the study is how might program outcomes relate to the program’s curriculum? We recommend building on the findings of this study through additional research focused on analyzing the curriculum of the academy using leadership development theories. Although participants in this study were able to describe impacts based on completion of the program, the participants were not asked to describe the program’s curriculum or any specific theories or concepts taught in the program; thus, information about how the curriculum impacts graduates could not be readily assessed. It would be valuable to program administrators to know how the program’s curriculum compares to current leadership development theories and approaches.

In addition, further research should also be conducted using interviews with the former CCLA program director, the current program director, and fellow county commissioners and judges who work with graduates of the program but who have not gone through the program themselves. Although this study used self-reports of outcomes and impacts from the program, efforts should be made to triangulate the self-reported data using a variety of sources of data so as to avoid subjection to biases (Russon & Reinelt, 2004). The current program director and former program director may have insight regarding additional outcomes and impacts resulting from the academy as well as possible testimonies to confirm this study’s findings. Interviews with coworkers of graduates may provide evidence to confirm or refute the participants’ self-reports of outcomes and impacts.

### Recommendation for Program Practice and Community Leadership

We recommend that the CCLA program consider developing opportunities to utilize the social networks of relationships formed through the academy. These networks may be instrumental for the mobilization of grassroots efforts and community leadership in the state of Texas. Program graduates are united in purpose and developed skillsets because of the program, and thus could be focused to take on key issues in the state from a community level. The relationships formed as a result of the academy may also be useful to researchers looking to study county leadership or social capital. Just as Van De Valk (2008) noted a lack of research pertaining to social capital’s influence in leadership development, the findings of this study points researchers to opportunities to examine how the CCLA program’s social networks are enhancing continued leadership development in participants beyond the program.

### Final Conclusions

Through the collection and interpretation of participants’ experiences in the CCLA program, we identified the reported learning outcomes of the program and recommended opportunities for program improvement. Documents and records were collected as artifacts of the program; however, participants provided very few artifacts, and thus we were disappointed in this aspect of the data collection. The few documents provided did support the themes that were formed from the data analysis. This study provides the CCLA program with a more complete picture of the program’s impacts and opportunities for improvement or modification. It is our hope that the
CCLA program may use the findings of this study to better serve Texas county commissioners and judges and thus continue to develop better leaders and county servants for the state of Texas.

References


Supervised Agricultural Experience Programs: An Examination of the Development and Implementation of Urban Programs

Eric D. Rubenstein, Andrew C. Thoron, Blake C. Colclasure, and Jillian A. Gordon

Abstract

Urban schools and school-based agricultural education programs (SBAE) face challenges to engage students in the educational system. Specifically, urban SBAE programs face unique challenges engaging students in the development and implementation of SAE programs. While SAE continues to be considered a central component to the total SBAE program, a lack of research exists on the utilization of SAE in urban programs. Therefore, this qualitative study sought to identify factors present in the development and implementation of exemplary SAE programs in urban schools. Two urban SBAE programs were purposively sampled through a one-day on-site visit, focus group sessions, and one-on-one interviews. Through the use of the constant comparative method, five themes emerged from the data: 1) Engaged Teachers, 2) In-Class Supervision, 3) Student Interest, 4) Partnerships in SAE, and 5) Development of an SAE Culture. The presence of an SAE culture was found throughout the data and was an essential factor to the development and implementation of student SAE programs. The researchers recommend further investigation of the development of an SAE program and the development of a model to assist agricultural education teachers in successfully creating a culture for SAE in their local SBAE programs.

Keywords: Supervised Agricultural Experience Programs, SAE, Urban SBAE

Introduction and Literature Review

Urban schools face unique challenges that must be addressed in today’s education system (Netzel & Eber, 2003). According to Netzel and Eber (2003), “Urban school districts have unique challenges due to factors such as size, high poverty rates, diverse communities, and limited resources” (p. 71). The school-community partnership is one such component. Leonard (2011) suggested that successful partnerships must build collaborative student focused relationships. Community partnerships can include a wide-variety of groups such as local businesses, organizations, agencies, foundations, universities, and parents (Leonard, 2011).

One of the most important partnerships described herein, is parental involvement. Reynolds, Crea, Medina, Degnan, and McRoy (2014) found parental invitations were critical to establishing such partnerships. Furthermore, the authors suggested such invitations go beyond traditional communication (e.g. phone calls, emails) and seek to engage parents through activities and extracurricular events (Reynolds et al., 2014). Cappella, Frazier, Atkins, Schoenwald, and Gillsson (2008) encouraged that conversations with parents be conducted orally to reduce

1 Eric D. Rubenstein is an Assistant Professor of Agricultural Education in the Department of Agricultural Leadership, Education, and Communication at the University of Georgia, 133 Four Towers, Athens, GA 30602, erubenstein@uga.edu.
2 Andrew C. Thoron is an Assistant Professor of Agricultural Education in the Department of Agricultural Education and Communication at the University of Florida, 307C Rolfs Hall, Gainesville, FL 32611, athonon@ufl.edu
3 Blake C. Colclasure is a graduate student in the Department of Agricultural Education and Communication at the University of Florida, Rolfs Hall, Gainesville, FL 32611, bcolclasure@ufl.edu
4 Jillian A. Gordon is a High School Agriculture Teacher at Clarke Central High School, 350 S. Milledge Ave, Athens, GA 30602, jilliangordon@uga.edu
miscommunication between the teacher and parent. Further, Cappella et al. (2008) suggested that parent/teacher communications take place at home to strengthen rapport.

Beyond the parent/teacher relationship, the success of urban students also relies heavily on strong relationships between students and staff (McKillip, Godfrey, & Rawls, 2012). In McKillip, Godfrey, and Rawls (2012) utilized methods of increasing valuable student-teacher relationships included the establishment of teacher advisory roles and opportunities for teachers and students to participate in community-building activities after school. Providing opportunities to increase the factors mentioned above, can positively impact the academic and career success of students enrolled in an urban school (McKillip, Godfrey, & Rawls, 2012).

Agricultural education programs continue to become established in urban areas. Agricultural education programs provide a link to increase positive student-teacher relationships, provide avenues for parental involvement, and build partnerships with community stakeholders and business (Phipps, Osborne, Dyer, & Ball, 2008). Within agricultural education, Supervised Agricultural Education (SAE) programs, originally known as the project method, assist in the establishment of partnerships between parents, community stakeholders, students, and teachers (Phipps et al., 2008). The utilization of the project method has been a fundamental component of agricultural education since its origin (Croom, 2008). As part of the Smith-Hughes National Vocational Education Act of 1917, the project method became a federally mandated requirement for all agricultural education students (Wilson & Moore, 2007).

Stimson (1915) stated that student projects should increase in difficulty, scope, and sequence each year of the agricultural education program. To ensure that student projects’ increased in difficulty, scope, and sequence, Stimson developed a set project that students would complete each year. The projects Stimson (1915) required students to conduct were:

- First year – a plant project of kitchen gardening or ornamental planting;
- Second year – an animal husbandry project of raising poultry, sheep, goats, swine, or bees;
- Third year – an advanced plant project of fruit production, market gardening, or producing fruits and vegetables for market;
- Fourth year – an advanced animal husbandry project of dairying, general farm management, or agriculture as a business.

Additional projects could be conducted or continued throughout the four-year agricultural education program. These projects could be the continuation of a previous year’s project. Likewise, a student could develop a project to solve a problem on their home farm (Stimson, 1915). While many projects were aimed at increasing student knowledge, Stimson (1915) felt that it was vital for families to be involved in the student’s project. Stimson (1915) argued that family interaction would increase the family’s knowledge of new research–proven techniques and practices. Further, Stimson (1915) alleged that student–parent interaction formed a relationship that would prove essential in the operation of the farm.

Finally, Stimson (1915) posited that an agricultural instructor had a distinct role in the success of the project method. Heald (1929) reported that since agricultural teachers were employed through the summer, Stimson required a weekly visit to each student’s farm. Additionally, teachers were expected to complete mid–summer and mid–winter professional development. Professional development was devoted to assisting teachers in fostering teamwork in their classrooms and communities (Heald, 1929). Stimson (1915) identified teamwork as a vital component of the project method.
Presently, Barrick et al. (2011) defined SAE as: “a planned and supervised program of experience-based learning activities that extend school-based instruction and enhance their [student] knowledge, skills, and awareness of the agricultural industry” (p. 9). SAE programs remain vital to the total school-based agricultural education program (SBAE) (Camp, Clarke, & Fallon, 2000). Hughes and Barrick (1993) purported that individualized instruction through SAE assisted in developing students’ self-confidence. Additionally, SAE allows students to develop solid connections between their classroom content and real world situations due to their participation in authentic experiences (National Council for Agricultural Education, 2015). Teachers overwhelmingly support the belief that SAE enhances classroom learning through real-life experience, sense of ownership, learning by doing, and enhanced agricultural knowledge (Camp, Clarke, & Fallon, 2000). Osborne (1988) and Swortzel (1996) reported the agriculture teacher as the most influential component to the utilization of SAE programs in SBAE. More recently, Rubenstein & Thoron (2015) corroborated the importance of agriculture teachers in the development and implementation of SAE programs in rural areas.

While abundant benefits and support for SAE exist within agricultural education (Dailey, Conroy, & Tolbert-Shelley, 2001; Dyer & Williams, 1997; Roberts & Harlin, 2007; Wilson & Moore, 2007), a disconnect remains between SAE philosophy and implementation (Wilson & Moore, 2007). Agricultural education literature has shown decreasing trends in the number of students beginning and completing SAE programs (Dyer & Osborne, 1995; Retallick, 2010; Steele, 1997; Wilson and Moore, 2007). Teachers agreed SAE was an integral component of the three-circle agricultural education model, yet report believing that SAE was inappropriate for their individual situation (Camp, Clarke, & Fallon, 2000). Wilson and Moore (2007) reported that excess paperwork, high student enrollments, and lack of farm backgrounds as factors discouraging teachers in West Virginia from implementing SAE programs. Retallick (2010) quoted an agricultural educator with the following sentiment: “SAE is the interworkings, the engine that makes Ag Ed work, but not as glamorous as FFA or classes” (p. 65). On top of these logistical factors, school administration, parents, and community members view teachers as FFA and agriscience teachers, but not as SAE supervisors. Furthermore, the pervasive perception of agricultural education was that it was only about production and vocational agriculture, limiting the opportunities for students coming from non-traditional backgrounds (Retallick, 2010).

There has been little research done looking specifically at SAE programs related to students and teachers in urban SBAE, however indicators present in past research highlight the importance for further examination of this demographic area (Barrick, Hughes, & Baker, 1991; Retallick, 2010; Steele, 1997). New instructional approaches to SAE have been developed to specifically target non-traditional agricultural students, however SAE continues to decline (Croom, 2008). Agricultural educators list changing demographics and societal attitudes to be the largest struggle in implementing SAE (Retallick, 2010) and research has shown a perceived need to expand the concept and scope of SAE to meet the requirements of a more diverse clientele (Barrick et al., 1991). Historically, agricultural educators have overlooked urban students and their connection to successful SAE implementation (National Research Council, 1988). Teachers list the lack of opportunity within the immediate area, increased need for creativity, and increased effort to find and supervise SAE opportunities as the primary reasons hindering the utilization of SAE programs for diverse groups of students (Retallick, 2010). Research by Henry, Talbert and Morris (2014) reported agricultural educators encountered more challenges within SBAE programs with urban students in comparison to rural students. Bobbitt (1986) found rural teachers placed more emphasis on SAE than their urban counterparts. Dyer and Osborne (1995) posited that major effort must be put forth to provide consistent SAE program focus and direction on a national level.

The importance of SAE in both the rural and urban classroom exists within the experiential nature of SAE (Knobloch, 2003). The experiential learning process of knowledge creation occurs
in four stages; concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). Within the context of agricultural education, Knobloch (2003) proposed the four pillars that support experiential learning in the agricultural education classroom were learning in real-life contexts, learning by doing, learning through projects, and learning by problem solving. SAE provides concrete experience in each of these pillars (Knobloch, 2003). For multicultural urban programs, hands-on activities include participating in first-hand experience offer the highest levels of engagement (Vang, 2010). Therefore, it is important to investigate methods of incorporating experiential learning into urban classrooms.

SAE remains an integral component of the total agricultural education program (Roberts & Harlin, 2007). However, little research has been conducted to examine the processes that agriculture teachers utilize when working with students to develop and implement exemplary SAE programs. Throughout the agricultural education literature base development and implementation processes have been described (Phipps et al., 2008; Stimson, 1917; Talbert et al, 2007), however these processes have been based on philosophy and historical practice. In order for SAE to remain relevant in agricultural science classrooms, it is vital that the definition and development of SAE evolves to address the situation and needs of urban agricultural education students (Barrick, et al., 1991). The previous presented issues of paradoxical SAE philosophy and implementation (Wilson & Moore, 2007), lack of facilities, resources and time (Camp, Clarke, & Fallon, 2000; Retallick, 2010; Wilson & Moore, 2007), and growing concern with meeting the needs of a changing demographic of students (Barrick, et al., 1991; National Research Council, 1988; Retallick, 2010), have caused the relevance of SAE in an urban setting to be questioned. According to Brown, Roberts, Whiddon, Goossen, and Kacal (2015), a lack of student relevance between agriculture subject matter and inner city workings existed. Furthermore, Henry, Talbert, and Morris (2014), suggested that there was a lack of students’ perceived connections to practical application of agriculture in urban communities due to unrecognized local agricultural industry. Therefore, this study investigated factors utilized during the development and implementation of SAE programs in urban settings to provide vision on ways to increase urban students’ participation in SAE.

**Purpose and Research Questions**

The purpose of this study was to describe factors present in the development and implementation of exemplary SAE programs in urban schools, validated by Priority Area Four and Priority Area Five of the National Research Agenda (Roberts, Harder, & Brashears, 2016). The following research questions guided this study:

1. What teacher factors were present in the development and implementation of exemplary SAE programs in urban schools?
2. What student factors were present in the development and implementation of exemplary SAE programs in urban schools?
3. What school factors were present in the development and implementation of exemplary SAE programs in urban schools?
4. What community factors were present in the development and implementation of exemplary SAE programs in urban schools?
5. What family factors were present in the development and implementation of exemplary SAE programs in urban schools?
Theoretical Framework

This study utilized a case-study design as described by Creswell (1998). According to Creswell (1998) researchers utilize case study research to conduct in-depth examinations of cases (single or multiple). In this study, researchers examined two agricultural education cases to describe their SAE development and implementation processes that were utilized to assist students with the utilization of SAE programs in SBAE. Furthermore, qualitative studies apply ontological, epistemological, and theoretical perspectives to theoretically ground research (Crotty, 2010).

The realism ontological perspective was utilized in this study due to the individual nature of SAE programs and students’ independent engagement in instruction and content. Realism suggests that individuals experience the world around them in their own way and create their own meaning from their interactions. These interactions then assist the learner in generating truths or knowledge that can be used for the further development of knowledge (Turner, 2008). Furthermore, agriculture teachers then engage with the students to assist in the construction of knowledge.

In this study, the researchers utilized the constructionist epistemological perspective and the theoretical perspective of constructivism. Constructivists believe that the reality a human embraces differs from the actual world (Guba & Lincoln, 1990). Therefore, humans must interact with the reality of the world around them to develop their own beliefs and knowledge (Crotty, 2010). Participants in this study were engaged in applying content learned in their agricultural education classroom to real-world environments where they were able to fully engage in developing meaning and knowledge from these interactions.

Finally, the theoretical framework of constructivism refers to an individual’s creation of meaning. Constructivists hypothesize that the meaning making process resembles a construction of knowledge where different experiences interact to develop meaning from a variety of situations (Crotty, 2010). In this study, participants actively participated in the development and implementation of individualized SAE programs when developing their knowledge of the SAE development process. Further, participants were able to develop schema between their previous knowledge and interactions with specific content with their authentic learning experiences garnered from their engagement in their SAE program.

Methods

The participants were purposively selected based on the researchers’ previous research partnerships and understanding of the utilization of SAE (Koro-Ljungberg, Yendol Hoppey, Smith & Hayes, 2009). The researchers were former agriculture teachers and strongly believed that SAE and experiential education are fundamental components of the total SBAE program. The researchers contacted an agricultural education faculty member and department of education program specialist who identified three to five urban agricultural education programs that met a priori criteria of exemplary SAE programs. The following criteria have been identified to define exemplary SAE programs: (1) 75% of students enrolled in agricultural education courses, at minimum, are engaged in multi-year SAE programs that consist of more than 100 hours of time invested by students (AAAE, 2013); (2) urban programs were SBAE programs where the location had a population of more than 50,000 people (US Census Bureau, 2010).

In order to gather evidence of criteria one, the researchers conducted phone interviews with the agriculture teacher at each of the identified schools. Agriculture teachers were asked to respond the following sample questions:

1. How many unduplicated students are currently enrolled in your agricultural education program?
2. How many of your students are engaged in a Supervised Agricultural Experience program?
3. Do each of the students engaged in an SAE program receive supervision?
4. Do students keep records related to their SAE program?
5. Do student programs increase in scope and sequence? Can you provide an example of a student’s program?
6. Are your students engaged in SAE programs that are related to the classroom instruction received in their agricultural education course?
7. In a few sentences, can you describe your thoughts about the role of SAE in agricultural education?
8. Would you be willing to host a researcher at your school to collect additional data? This visit would be of no expense to you.
9. Would you be willing to assist the researcher in recruiting students, their parents, and other program partners?

Following the interviews, the researchers referenced data collected from the United States Department of Education and the United States Department of Agriculture to ensure that the selected schools met criteria two. The selected schools were then notified and onsite visitations were scheduled for data collection. The agriculture teachers were then asked to select twelve students and their parents to participate in the data collection process. Six of the selected students had newly established SAE programs (New SAE Student), while the remaining six students had conducted SAE programs for three years or more (Advanced SAE Student). Additionally, community members that were involved in the selected student SAE programs were asked to participate in a focus group during the on-site visit.

The site visits were scheduled as a one-day period for data collection and observation. Each site visit included two student focus groups, one parent focus groups, one community member focus group, and teacher interview(s). The focus groups were comprised of four and six participants (Morgan, 1988). During the site visit, the researchers observed the teacher’s SAE instruction and conducted informal interviews with randomly selected agriculture students who did not participate in the focus group. The informal interviews and observations assisted in establishing consistency between all of students enrolled in the program. Data saturation was achieved and noted through the data collection process.

The researchers utilized a semi-structured interview guide during the interviews and focus groups. The semi-structured guide question topics included: description of the SAE development process, the teachers’ SAE philosophy, description of the teachers’ SAE instruction, students’ perceived role of the agriculture teacher in the development process, and participant’s motivation to remain involved in an SAE program. Each focus group and interview was audio recorded and transcribed for data analysis. Each individual interview lasted between 42 and 63 minutes, while focus groups lasted between 48 and 100 minutes. During the transcription process all participants were assigned pseudonyms and all identifiers were removed to ensure data anonymity. Focus group and interview participants received an incentive for their participation. The incentive was utilized as a motivation to participate in the focus group. Parents and community members who participated were provided with $25, while the agriculture teachers were provided with $75 for their participation and assistance with selecting and communicating with the participants.

A four-step constant comparative method, constructed by Lincoln and Guba (1985), was utilized to make comparisons across multiple cases. This study was conducted to identify factors that should be utilized by SBAE teachers when implementing and developing SAE programs in urban secondary SBAE programs. The researchers:
1. Established the creation of categories that described occurrences within the data,
2. Redefined the established themes,
3. Integrated categories as they become more defined during the analysis process, and
4. Constructed the written manuscript.

In order to safeguard the credibility of the research study, the researchers utilized member checking, peer debriefing, persistent observations, referential adequacy materials (materials prepared for parents and students), and triangulation (Dooley, 2007; Lincoln & Guba, 1985). Member checking was conducted both immediately after the focus groups and following the transcription process. Following individual analysis of the data the researchers met to discuss the emergent themes to ensure that all perspectives were considered in the data. Credibility was upheld by engaging in persistent observations of the students and teachers throughout the entire visit to each school. Thorough and thick descriptions of the context and data were utilized to uphold the transferability and provide readers the ability to apply and fully understand the results (Lincoln & Guba, 1985). During this study the researchers kept methodological journals to document methodology decisions and reflection to ensure reliability and trustworthiness (Dooley, 2007).

Findings

The participants in this study included: eight community members, four teachers, 12 parents, and 18 students. See Table 1 for the participants’ demographic information.

Table 1

<table>
<thead>
<tr>
<th>Identification</th>
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<th>Profession</th>
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<tbody>
<tr>
<td>Community Member-1</td>
<td>F</td>
<td>Veterinarian</td>
</tr>
<tr>
<td>Community Member-2</td>
<td>M</td>
<td>Retired Agriculture Teacher</td>
</tr>
<tr>
<td>Community Member-3</td>
<td>M</td>
<td>Local Farmer</td>
</tr>
<tr>
<td>Community Member-4</td>
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<td>Community Member-5</td>
<td>M</td>
<td>Retired Teacher</td>
</tr>
<tr>
<td>Community Member-6</td>
<td>F</td>
<td>Information Technology Specialist</td>
</tr>
<tr>
<td>Community Member-7</td>
<td>M</td>
<td>USDA Employee</td>
</tr>
<tr>
<td>Community Member-8</td>
<td>F</td>
<td>US Fish and Wildlife Service Technician</td>
</tr>
<tr>
<td>Teacher-1</td>
<td>M</td>
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</tr>
<tr>
<td>Teacher-2</td>
<td>F</td>
<td>Middle/High School Agriculture Teacher</td>
</tr>
<tr>
<td>Teacher-3</td>
<td>M</td>
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</tr>
<tr>
<td>Teacher-4</td>
<td>F</td>
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</tr>
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</tr>
<tr>
<td>Parent-2</td>
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<td>Accountant</td>
</tr>
<tr>
<td>Parent-3</td>
<td>F</td>
<td>County Claim Assistant</td>
</tr>
<tr>
<td>Parent-4</td>
<td>F</td>
<td>County Extension Agent</td>
</tr>
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Table 1 (continued)

Participant Demographic Information (n=42)

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</thead>
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<tr>
<td>Parent-6</td>
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<td>Stay at Home Caregiver</td>
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<tr>
<td>Parent-7</td>
<td>F</td>
<td>County Sustainability Manager</td>
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<td>Parent-8</td>
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<td>Parent-9</td>
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<td>Parent-10</td>
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<tr>
<td>Parent-12</td>
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<td>Office Manager</td>
</tr>
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<td>Student-1</td>
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<td>Advanced SAE Student</td>
</tr>
<tr>
<td>Student-2</td>
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</tr>
<tr>
<td>Student-3</td>
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<tr>
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<tr>
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<tr>
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<td>F</td>
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</table>

Engaged Teachers

Use of Examples in Instruction. Instruction in SAE occurred in both of the schools that participated in the study. Similarly, previous students’ SAE programs were used as examples of potential SAE options for students during the development and implementation process. The examples that were utilized assisted students in selecting and developing an SAE program that met their needs and the teacher’s expectations. Student-8 stated “he (teacher) would give us examples from past years, or proficiencies that FFA had recognized at a convention or something of that nature. He presented it in a way that was easy to understand.” Teacher-1 noted that he wanted
students to “use examples from their own life” while they were generating ideas for their SAE programs. Teacher-2 added “in the beginning, it is about getting those ideas out there, showing them what's been done before, not that they're limited to that, but just to get their wheels turning.” When introducing the topic to students, Teacher-2 stated she retained students’ “PowerPoint or a poster board type displays” from prior years SAE showcase to use in-class. During her presentation, Teacher-2 explained, “this is an example of what a few students did … this is what I really liked about this project … this is where this project lacked a little bit” to assist students in critically examining each project. The utilization of examples assisted students in discovering and generating their SAE program topic. Student-1 added that if the examples provided in-class did not help with the generation of an SAE topic that the agriculture teacher(s) “helped keep ideas flowing if we came to a point where we can’t really think of anything.” The need for an engaged teacher who utilized examples was kept at the forefront of the conversation in the focus groups and interviews and served as an integral component of an exemplary SAE program.

**Theoretically Practical and Hands-on.** Throughout the SAE development and implementation process the participants noted SAE programs were introduced through engaging learning activities. Teacher-1 noted he utilized “free writes, some exits out the door, and a few opening activities” to begin and end classes when instructing about SAE programs. Student-8 recalled they went “outside and he (Ag Teacher) had some kind of little rhyme or riddle” developed from a mnemonic device that described the different types of SAE. Student-17’s agriculture teacher “utilized video clips and interactive stimulation to help make it connect” with students.

When discussing the success of the development and implementation process, Community Member-3 explained SAE as a hands-on learning opportunity that exposed students to “the way it's going to be when you get out of school. You're not going to have somebody feeding you a lecture. It gives them a little leg up on the real world.” Community Member-5 further explained student learning in SAE occurred from both success and failure. He explained,

I think that you can learn much more from failure than you can learn from success. If your SAE project does not succeed in meeting the goals that you had achieved for, but you can look at it and see where you went wrong and decide what you'd do the next time around. That's tremendous success and learning.

Teachers, parents, and students held the same thought of student learning being an essential component of SAE programs. Students and teachers noted that their learning was measured for a grade in their agricultural education course. Students believed an SAE grade needed to be evaluated on an individual basis and that no one rubric or scorecard could fully assess students’ SAE programs. Student-2 explained,

There’s no black or white answer. It’s going to vary from person to person. I mean just to each their own, I guess. I mean if they think that they’re getting very far with their SAE, then that’s great for them, because SAE is meant to give confidence and excitement about the field of agriculture and what it can offer for them. It’s going to vary from person to person.

SAE was considered an essential component of the agricultural education program. Student-8 described, “Last year I do know that it was 20% of our grade and this year SAE is 45% of our grade.”

**Teacher/Student Bond.** Throughout the SAE development and implementation process, students, parents, and community members noted that students’ respect and admiration for their agriculture teachers grew. Community Member-5 explained that SAE helped his son find “his place in the school. He hadn't felt like that for a long time. Just those teachers taking an interest in what
he was doing, and connecting that to school, for him, was huge. It happens for a lot of kids that way.” Student-18 explained when having issues with her SAE, she found it easy to talk with her agriculture teachers because they share their own experiences and struggles. She stated, “it's like you get to know them and what they've gone through, so you don't feel bad when you're going through the same thing.” Student-16 described her agriculture teachers as being able to “get to know each and every one of us on a more personal level than most teachers” because of their involvement in the SBAE program, including their SAE involvement. Student-18 continued, “the relationship between the ag teacher and the student helps a lot to make your ag experience better, to push your SAE project forward.” Because of the relationships built between the agriculture teacher and students, Student-3 believed her relationship with her agriculture teacher allowed for her teacher to “push me to be able to do better … I didn't even know what an SAE was and he worked with me through everything.” Throughout the interviews and focus groups, it became evident that the bond developed between the teacher and student influenced the development of relationships between the community and SBAE program, students and students, and parents and their students.

**In-Class Supervision**

While the participants considered supervision an important component of SAE programs, supervision primarily occurred within the classroom setting. Student-3 explained, during in-class supervision her agriculture teacher constantly reminded students of upcoming “deadlines and all of the basic requirements of the project … when it should be done and how we need to do it.” Teacher-2 described her approach to in-class supervision as “checks periodically throughout the semester that they need to fill out and tell us what they've been up to, what percentage of the project they think they've completed. Again, there's space to ask questions and those types of things.” The participants explained that on-site supervision occurs through the utilization of community members, parents, and employers. Parent-7 noted, the agriculture teacher “supervises them when they're in-class. My daughter is completing an internship that he [Ag Teacher] helped provide her with, where the veterinarian at that particular vet hospital supervises her. Outside of that particular internship, we [parents] help her if she needs assistance.” The conversations that were fostered through in-class supervision experiences assisted in the continuation of those conversations with parents, community members, and school officials.

**Student Interest**

The development of an SAE program was centered on the conceptualization that the student had to have a genuine interest in the SAE topic. Teacher-2 explained,

> If a student chooses a project and then it doesn't work or they want to pursue a different area, there's no use in beating a dead horse. Pick something different that you are interested in because I don't want them to drag their feet and be miserable through the whole process.

Teacher-4 further explained, “I think if an SAE program is going to work, it has to be from the student's initial motivation to want to do it … they have to have some intrinsic goals and motivation to want to do it.” Parents believed having the choice to select a topic of interest, increased students’ passion for the topic. Parent-9 explained,

> When they [students] make their choice, it seems like they're picking it because they have passion for it, they want to learn about it, they want to be able to share what they have learned. I think it drives them differently because they're picking it.
Beyond just a connection to the students’ interest, students and teachers believed that SAE programs needed to have flexibility to progress with students as they discovered their passions and future career paths. In some cases, students’ SAE programs would become more refined each year. Student-3 stated, “originally my SAE started as just agribusiness in general and then it focused down and it progressively got focused in one area.” Similarly, some students’ interests change courses completely. Student-2 explained, “my SAE started off as a project just about food safety, then that changed into educating the public about food safety, then it changed to elementary education for Ag and then it changed to purely elementary education.”

Partnerships in SAE

In the development and implementation process, teachers recognize that they need to develop partnerships with community members and parents to assist students in acquiring the necessary resources to conduct their SAE programs. Teacher-3 developed a “strong working relationship with our advisory board … they are our eyes and ears on the ground” to help secure student SAE resources. Similarly, Teacher-2 sends “letters home to all of my students when I assign the SAE program that explains what it is, that it's an assignment in the class.” He believed that the letter informed parents about the details of an SAE program and assisted in engaging parents in students’ SAEs. Parent-9 explained when her son would normally “blow stuff by me just to catch a reaction or whatever but when he came up with his project, I thought, ‘You got to be kidding me? Who thinks like that?’” By sharing details with this parent and engaging the student in SAE, the agriculture teacher gained a supporter of the SBAE program and SAE.

Beyond the teacher’s beliefs, students and community members believed that SAE increased students’ motivation to participate in the local FFA chapter. Community Member-6 shared, “I think SAE maybe have motivated some to participate in FFA, rather than vice versa. Sometimes they get into those SAE projects, and they see those connections [between the three components of SBAE] … then you've got a life-long FFA member.” Student-5 explained that FFA members

Influenced me … when we’re at state convention, you see all the people that receive their state degree, or at nationals, you see national, the American degrees … all those require people to do their SAE Projects … you can get proficiencies and stuff like and seeing other members excel in that area, makes me want to achieve something greater than just a small project.

Development of an SAE Culture

Through this study, the need for a culture that supports the utilization of SAE was needed for the successful development and implementation of SAE programs. The teachers recognized a need to ensure that consistent requirements were needed in multi-teacher SBAE departments. Teacher-4 explained the process in their multi-teacher program,

We meet each year and go through the packet and talk about things that have gone well, things that haven't gone well, so that we're all on the same page in what we're doing because if [Teacher-2] doing one thing and [Teacher-3] is doing another, and a kid takes a class from a different person, they're going to say, 'we had to do this with so and so. Now you're making us do this. Why?’ We want to make sure we're consistent in our expectations, in how we guide students through the process, so that if they take another class, they know where the road is headed, and we don't have that playing mom against dad type of situations where kids or parents can be upset about how one teacher handles it versus another.
The teachers in this study stated that this process does take time to implement. However, for SAE to be successful they believed it was a vital component to their yearly preparation to introduce SAE programs. Parent-10 explained, “at the end of the day, is it really something that they enjoy doing and are going to tell others about. I think we see that here. The students benefit from their SAEs … that makes all the difference.” Community Member-2 noted,

I believe SAE helps keep young people interested in school … maybe keep them engaged in school … if they like one aspect of school, they will likely do well in other aspects of school … I think it has, in my mind as a former teacher, the SAE program is one of the most valuable components of all of the things that we do.

Conclusions, Implications, and Recommendations

Engaged teachers through all levels of SAE was the outstanding influencer of students developing and implementing a SAE while in a SBAE program. The literature base supports this finding across decades (Osborne, 1988; Swortzel, 1996) as well as settings in both rural (Rubenstein & Thoron, 2015) and urban programs. The strength of which teachers engage students through local examples, founded in the context of the community, was found to be equally important for the student to believe they could develop and implement a SAE program. The researchers concluded that urban programs, led by the teacher, held events similar to job fairs to showcase ideas that were authentic in nature and of local impact and interest to the community in their classrooms, similarly to rural programs as found by Rubenstein and Thoron (2015). Similarly, Henry, Talbert, and Morris (2014) suggested the utilization of several authentic examples to assist students in establishing connections between SAE and the local community. By showcasing local SBAE SAEs, peer-to-peer interactions were fostered and engaged students in recognizing the relevance between the community and their SAE topic. Brown et al. (2015) concluded, a shortcoming of urban programs was the lack of relevance between subject matter and students’ daily lives. In this study, the researchers found similar findings for some students; however, the agricultural education teachers in each of the examined cases sought various means to help to reduce this disconnect through various in-class experiences and partnerships with community stakeholders. Through teacher engagement and directions, students were able to establish connections between their daily lives, classroom content, and SAE. Finally, the high level of teacher engagement in SAE spanned classroom instructional time, hands-on practical application of SAE examples, and sustained conversations. SAE was not simply a unit of instruction, nor a conceptual experience that happened outside the classroom, but rather it was integrated and central to the program through authentic investigations, peer-to-peer interaction, classroom grades, and individualized goals of the student. Vang (2010) suggested a similar approach when engaging urban students at the highest level.

The implications of the engaged teachers led to the teacher to student bond just as McKillip, Godfrey, and Rawls (2012) described in the study of relationships between school faculty and urban students. Through SAE, students held high regard for their teacher, at times calling them the ones that care or understand them (as students). This in turn created a learning bond and a learning community where SAE perpetrated through the program. Barrick and Hughes (1991) remain correct that the individualized instruction of SAE assists students in developing self-confidence and a realization they can conduct an SAE. Therefore, it is recommended SBAE teachers make SAE an integral and continual focus of the classroom through instruction in and about agriculture and highlighting of SAEs conducted at the local level. It is also recommended that teacher education programs model what SAE instruction looks like on a day-to-day level in the total school-based program for preservice teachers. Curriculum development and agriscience professional development should assist teachers in establishing a SAE focus in their local program.
Specifically, in-class supervision was found to be a foundation for successful SAE development and implementation. Individualized in-class teacher to student encouragement led to conversations between students and parents. This conclusion is supportive of Reynolds et al. (2014) who stated parental engagement of student activities was critical in the urban setting. Programs in this investigation either sent letters home or held meetings with parents; however, both programs provided an in-class structure and supervision that initiated the need for students to engage in conversation with their parents. In-class supervision created a connection between parents and the SBAE program. Parental support of SAE and SBAE increased student motivation to implement and maintain an SAE. This conclusion leads to the recommendation of parental support and parental education of SAE pointed out by Rubenstein (2014) of rural SBAE programs that incorporate SAE successfully. This extra effort in urban programs was called for by Bobbitt (1986) decades ago, and it was still found to be one of the factors to implementation of successful SAE programs in urban SBAE. It is recommended that teachers and teacher educators This goes above and beyond being counted as a portion of the course grade, but connects parental awareness and support to student learning in the SBAE program.

Partnerships in SAE were formed through engaged teachers, parental support, and a network of partners that focused specifically on SAE. It is recommended that SBAE programs develop an advisory council of partners that focus specifically on SAE. It is common that SBAE programs have a FFA Alumni that has an initial focus on FFA, awards, and recognition. Equal to an alumni chapter, SBAE programs maintain an advisory council, which has a primary focus on the total program, facility, and curricular needs. However, both groups have primary motivators that may cause for SAE to become overlooked for other pressing concerns of the SBAE program.

Lastly, the development of an SAE culture was found to be a concluding theme throughout all the findings. An SAE culture that includes engaged teachers, parental figures, students, and community members takes years to develop. Rubenstein (2014) found that an SAE culture developed over a five-year period and involved growth in relationships between teachers and partners and centered on student engagement. This finding further supports the work of Roberts and Harlin (2007), of SAE being an integral component of a total SBAE program. As more urban SBAE programs emerge, research must identify factors that contribute to the success of these programs. Finally, a handbook for new teachers should be created in regards to integration of SAE culture into an SBAE program. Student motivation and drive should be further investigated to establish motivating factors for success in implementing SAE programs.

**Recommendations**

Further investigation needs to be done in urban SBAE programs especially in the realm of SAE. Therefore, the researchers recommend the following recommendations for future research to examine:

1. Student motivation should also be investigated on the students drive to sustain a SAE programs over time and identify if sustained SAE programs lead to student career engagement in the industry of agriculture.
2. Student motivation and drive should be further investigated to establish motivating factors for success in implementing SAE programs.
3. Investigations should be sought to explain how SAE culture is created in urban SBAE programs.
4. A model for SAE culture should be developed and then tested in urban SBAE programs.
5. The lack of relevance between subject matter and students’ daily lives to propose different methods that can be utilized by urban agriculture teachers to alleviate the disconnect between the relevance of class content and student’s daily lives.
6. The feasibility of an advisory committee of partners who focus on student SAE program development. The implications might lessen the burden of time, recourses, and relevance pointed out as barriers to implementation by Retallick (2010).

Furthermore, the authors propose the following recommendations for teacher educators to:

1. Develop a handbook for new teachers should be created in regards to integration of SAE culture into an SBAE program.
2. Integrate SAE culture development and maintenance into agricultural teacher education program curriculum.

Finally, the authors propose the following recommendations for practitioners to:

1. Prepare a classroom structure that supports student learning through individualized SAE.
2. Ensure that all students are provided an opportunity to engage in an SAE program.

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