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(Terms end on December 31)

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The Development of Preservice Agriculture Teachers’ Pedagogical Content Knowledge through a Greenhouse for Teachers Course

Amanda M. Wooditch¹, Amber H. Rice², Jason B. Peake³ & Eric D. Rubenstein⁴

Abstract

The purpose of this qualitative research study was to explain the development of preservice agriculture teachers’ PCK for the concept of plant fertilizers within a content-focused methods course. The emergent central phenomenon was an overall lack of PCK development for plant fertilizers, highlighted by five main themes that impeded the development. Preservice teachers felt less self-efficacious in horticulture content knowledge and possessed a greater desire for horticulture content knowledge over pedagogical knowledge. Additionally, the preservice teachers exhibited development of horticulture content knowledge and mathematics content knowledge through the unit. Finally, the lack of a content knowledge foundation inhibited the development of PCK in preservice teachers, despite the purpose of the course and vision of the instructor. Recommendations include more purposeful integration of PCK at the preservice level, utilization of tools like the CoRe rubric (Loughran, Mulhall, & Berry, 2004) during lesson planning, increased field experience imbedded in the teacher preparation program, and a more careful examination of the preservice teachers’ pre-existing content knowledge base prior to enrollment in the content-focused methods course.

Keywords: Preservice Agriculture Teachers; Pedagogical Content Knowledge; Preservice Agriculture Teacher PCK; PCK Development

Introduction

Teachers perform a significant role in the process of student knowledge acquisition and construction (Gablinske, 2014). Effective teaching of any content area requires teachers to develop a variety of professional knowledge bases that undergird instruction (National Research Council, 2010). Historically, there have been shifts in which knowledge bases are considered most important for effective teachers to possess, with content knowledge and pedagogical knowledge both having periods of focus in early research, certification, and professional development efforts (Ong, 1958). Shulman (1986) recognized the importance of content knowledge during a time when pedagogical knowledge was at the forefront of education reform. He postulated that teachers possessed more

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than just content knowledge and pedagogical knowledge alone, and coined the term pedagogical content knowledge (PCK) to describe knowledge specific for teaching content (Shulman, 1986).

PCK research has blossomed over the past three decades, with various models and definitions utilized across education disciplines to describe the elusive knowledge base (Kind, 2009). More recently, Morrison and Luttenegger (2015) defined PCK as a teacher’s intersection of content knowledge, pedagogy, and the context of the learning situation. The foundation of PCK lies in a teacher’s ability to convey knowledge to students effectively and aid them in developing a deeper understanding of content (Morrison & Luttenegger, 2015). PCK is not solely based on what a teacher knows about a content area, but rather how they are able to use that knowledge purposefully while teaching their students (Beyer & Davis, 2011).

Despite the importance of PCK in the literature, empirical research illuminates a struggle for teachers in numerous education disciplines to develop this complex knowledge base (Ball, Thames, & Phelps, 2008). Specifically, in agricultural education, Rice and Kitchel (2015a) found preservice teachers were displeased with the quality and quantity of content knowledge gained in their teacher education programs and their perceived ability to transfer that knowledge to their future classrooms for teaching. While time and experience are necessary ingredients in the cultivation of PCK, development can begin to occur at the preservice level with the aid of teacher preparation programs (Hume & Berry, 2011; Magnusson, Krajcik, & Borko, 1999; and Schneider & Plasman, 2011). One such course with potential to develop PCK in preservice agriculture teachers is the Greenhouse for Teachers course at the Southern Land Grant University (SLGU). This qualitative study will focus on elucidating the PCK trajectory of preservice agriculture teachers within the context of a plant fertilizers unit within the Greenhouse for Teachers course.

**Literature Review**

PCK has become accepted across education disciplines as a dynamic form of teacher knowledge that is constantly being expanded and transformed from other teacher knowledge bases (Nilsson, 2008). At times, it can seem meaningless because of its extensity, or it can seem reiterative because of its narrowness (Nilsson & Loughran, 2011). Various models and definitions have attempted to further describe PCK, often including knowledge of students, knowledge of instructional strategies, knowledge of curriculum, and knowledge of assessment, all within a content area context, as essential components (Kind, 2009). More recently, PCK has been defined as not only specific to a particular concept or topic, but also specific to the individual teacher, their personal beliefs, and the situation (Van Driel & Berry, 2012). PCK research studies have explored disciplines ranging from science education, to elementary education, to agricultural education; have focused on both practicing and preservice teachers; and have targeted topics as broad as plant science and as specific as using particle models in chemistry (De Jong, Van Driel, & Verloop, 2005; Magnusson et al., 1999; Nilsson & Loughran, 2011; and Rice & Kitchel, 2017).

Regardless of the context or domain, PCK is a critical knowledge base not only for practicing teachers to possess, but also for preservice teachers to begin to develop (Kilic, 2009). Preservice agriculture teachers typically spend four years in a teacher preparation program with the expectation that upon completion they will gain the knowledge needed and the skills necessary to effectively teach their future students (Rice & Kitchel, 2015a). University teacher educators have similar goals when preparing preservice teachers. If teachers are not well-versed in the content they are teaching, they are in danger of passing on misconceptions and inaccurate information to their students (Darling-Hammond & Bransford, 2005). The desire to adequately prepare preservice teachers for the numerous challenges they will face in their future classrooms is a priority for teacher educators nationwide (Stuart & Thurlow, 2000).
However, preservice teachers do not enter teacher preparation programs as blank slates. Contrarily, they bring with them preformed beliefs about education based on their prior knowledge and experiences (Stuart & Thurlow, 2000). These beliefs are usually formed early, and they rarely fade away, even after years of purposeful instruction (Darling-Hammond & Bransford, 2005; Kagan, 1992). The challenge for teacher educators resides in the fact that many of those beliefs are inaccurate and faulty, which can lead to issues in the development of preservice teacher knowledge, including PCK (Stuart & Thurlow, 2000). Nilsson and Loughran (2011) contributed to the research of PCK development in preservice teachers with a study involving preservice elementary science teachers. Their study showed if preservice teachers are engaged in purposefully identifying, self-assessing, and clearly developing their knowledge of teaching in a specific content area, their understanding of PCK can increase (Nilsson & Loughran, 2011).

There have been a myriad of studies exploring the PCK of preservice teachers. In their science-based study, Nilsson and Loughran (2011) utilized the content representations (CoRe) rubric designed by Loughran, Mulhall, and Berry (2004) to research the development of PCK in preservice elementary science teachers enrolled in a science methods course. They discovered PCK exploration can offer an alternative way of thinking about preservice teacher preparation that goes beyond traditional teaching methods (Nilsson & Loughran, 2011). Finally, Rice and Kitchel (2015a) uncovered a lack of agricultural content knowledge confidence in preservice teachers at a large mid-western university. The participants in the study revealed hesitance for teaching agriculture subjects for which they did not feel efficacious in the content (Rice & Kitchel, 2015a).

There have been few studies conducted that relate to the PCK development of preservice teachers specifically in agricultural education (Rice & Kitchel, 2015b). Schneider and Plasman (2011) recommended more research concentrate on preservice teacher PCK development within specific topic contexts. For this study, not only was agricultural education the overarching discipline of focus, but the specific topic of plant fertilizers was highlighted. According to the Southern State (SS) Department of Education (2013), plant science and horticulture are among the most commonly taught content areas in the SS. This study heeds the previous scholar recommendations through its investigation of preservice agriculture teachers’ PCK development in one of the more commonly taught areas of agriculture.

Purpose and Research Question

The purpose of this qualitative research study was to utilize grounded theory methods to explain the development of preservice agricultural teachers’ PCK for the concept of plant fertilizers during a fertilizers and supplements unit. This unit was a part of the Greenhouse for Teachers course curriculum at a Southern Land Grant University (SLGU). The central question guiding the study was: How does preservice agriculture teachers' PCK for the concept of plant fertilizers develop during a Greenhouse for Teachers content-focused methods course? This study aligns with priority four of the 2016-2020 National Research Agenda- meaningful and engaged learning in all environments (Roberts, Harder, & Brashears, 2016).

Methodology

This research study employed a grounded theory design. Grounded theory was selected based on the exploratory nature of the central research question. PCK is a complex knowledge base that develops over time with experience (Hashweh, 2005; Kind, 2009). Because this study was focused on a developmental process, grounded theory methodology was an appropriate methodological fit (Birks & Mills, 2015). Additionally, conceptualization of preservice teachers’
PCK development for a specific concept (plant fertilizers) can serve as a foundation for future studies. Specifically, this study was guided by the work of Birks and Mills (2015).

The purpose of a grounded theory approach is to generate new theory from collected data (Birks & Mills, 2015). Because grounded theory is consistent with the philosophy of pragmatism, this grounded theory study was approached using a pragmatic lens (Birks & Mills, 2015). According to Birks and Mills (2015), the ontological, epistemological, and methodological roots of the pragmatic paradigm are in line with grounded theory methodology.

It is important that I not only share the epistemological lens that guided my study, but also disclose my positionality because of its impact on my research (Creswell, 2013). As an undergraduate student, I was enrolled in numerous methods and curriculum development courses that were designed to develop pedagogical knowledge. I have also taken courses that covered a range of content knowledge areas including: agricultural technologies, soils, and aquaculture, to name a few. When I began my student teaching experience, I realized there was something missing from my teacher training. I possessed some content knowledge and some pedagogical knowledge, but I failed to learn how to link the two together. I am currently a practicing agriculture teacher, and I continue to find myself attempting to link content knowledge and pedagogical knowledge in my instruction. The goal of my research is to conceptualize the PCK of preservice teachers, so the findings can be used to assist teacher preparation programs.

Participants

Participants in this study included six preservice agricultural education teachers enrolled in a Greenhouse for Teachers course. Preservice teachers were chosen as the population to determine how their PCK for the concept of plant fertilizers were formed. All participants were in their third year of the agricultural education program. Educational backgrounds of the participants prior to enrollment in the program varied. Commonalities included all preservice teachers had all taken introductory-level education courses before the Greenhouse for Teachers course. Three out of the six preservice teachers had taken a Soils and Hydrology content course and an Agriscience for Teachers content focused methods course at the SLGU. All six preservice teachers will be completing their student teaching experiences one year following their participation in this study.

Data Sources and Collection

PCK can be explored using a wide array of methods, and more than one data source is recommended for thorough investigation (Morrison & Luttenegger, 2015). To effectively elucidate the development of PCK, even for a concept as specific as plant fertilizers, it was important to investigate different sources of data that could reveal PCK. Four sources of qualitative data were collected including: pre-observation interviews, classroom observations, field memos, and post-observation interviews. Triangulation was achieved by utilizing the four data sources to corroborate evidence (Creswell, 2013). The use of various sources of data added rigor to the collection process and increased the probability that PCK would be captured given this study focused on only one concept within the course (Creswell, 2013).

Because PCK is content and topic specific, the plant fertilizers unit within the Greenhouse for Teachers course was utilized for data collection and focused on the following SS Department of Education (2013), General Horticulture and Plant Science standard: AFNR-GHPS-9 Explore the use of plant fertilizers and proper fertilizing methods.
The unit was taught over a course of two class meetings. The first day was used primarily for lecture. In this lecture, the professor began and ended with discussions about pedagogical strategies that could be used to teach the content. He also included instruction in the content knowledge involved in a plant fertilizers unit. The second day was used for application of that content knowledge. The preservice teachers were divided into three groups in a greenhouse laboratory setting to perform three separate lab activities related to the concept of plant fertilizers. The laboratory activities included the following: irrigation controls, temperature controls, and water-soluble fertilizers. The groups rotated in thirty-minute increments with the purpose of developing knowledge in the content of plant fertilizers as well as how to teach that content to future middle and high school students.

Data from this study were collected spring of 2016 during the plant fertilizers unit in a Greenhouse for Teachers course. Pre-observation interviews took place at least one week prior to the classroom observations of the unit. These one-on-one semi-structured interviews were audio recorded for transcription. The following are examples of questions that the preservice teachers were asked during the pre-observation interviews: 1) Tell me about your background in plant science specifically related to this plant science unit, 2) why did you enroll in Greenhouse for Teachers, 3) what specific teaching strategies could be used if you were teaching this unit, 4) what specific assessment strategies could be used to teach this unit, and 5) what are your beliefs about teaching greenhouse and plant science? Each day of the unit was observed, and the researcher recorded field notes during each classroom observation. The purpose of the observations was to provide further context to the unit and to enable the researcher to witness first-hand student and instructor interactions, questions that arose from instruction, and were utilized as prompts for questions in the post-observation interviews.

Post-observation interviews were conducted after the unit was complete. It was important to conduct the interviews as soon as possible after the completion of the unit, so the events from class were easier to recall for the preservice teachers. These interviews reflected on the unit and were designed to encourage preservice teachers to think more deeply about their PCK development for plant fertilizers. The following are examples of questions that the preservice teachers were asked during the post-observation interviews: 1) What aspects of this unit (if any) contributed to your ability to teach this unit in the future, 2) what aspects of this unit (if any) contributed to your ability to design curriculum for this unit in the future, 3) what aspects of this unit (if any) contributed to your ability to create assessments for this unit in the future, 4) What aspects of this unit (if any) contributed to your understanding of student learning for teaching this unit in the future, and 5) what specific teaching strategies could be used if you were teaching this unit?

Data Analysis

Following the guidelines of Birks and Mills (2015), this grounded theory study required collection and analysis of data to be completed simultaneously. Each interview and observation video was transcribed verbatim. All data sources were used during data analysis. Constant comparative analysis was performed to compare data against data (Birks & Mills, 2015). Data were sorted during collection, initial codes were developed, and questions were altered to explore emergent phenomena present in the data (Birks & Mills, 2015).

NVivo 10 qualitative software was the data management platform used for analysis. All verbatim transcriptions, field memos, and observation videos were loaded into the program for analysis. NVivo 10 was utilized to organize and code data, establish connections between codes, create memos, and organize literature related to the study. Open, axial and selective coding
procedures were followed to develop codes, connect codes into categories, and to develop themes, respectively (Birks & Mills, 2015).

Validation Strategies

Four validation strategies for qualitative work as described by Creswell (2013) were utilized in this study. The strategies included: triangulation, clarifying researcher bias, member checking and rich, thick description. The four data sources collected throughout the study were utilized to provide evidence of the phenomena. Triangulation was attained by gathering the data from both pre and post observation interviews, classroom observations, and field memos. Corroborating evidence from all four data sources were used to shed light on the emergent themes (Creswell, 2013). Researcher bias was clarified by addressing past experiences, prior bias or prejudices, and orientations that could have possibly shaped the interpretation of the study (Creswell, 2013). Rich, thick description was used to provide a clear explanation of the development and findings of the study, including participant quotes and researcher observations (Creswell, 2013). Finally, the researcher engaged in member checking of the findings to ensure accuracy of the participants’ responses (Creswell, 2013). This is the most crucial technique for establishing credibility in qualitative research (Lincoln & Guba, 1985). Member checking in this particular study involved restating and summarizing information during interviews, checking transcripts, and sharing emergent findings with participants for feedback.

Findings

The emergent central phenomenon was an overall lack of PCK development for plant fertilizers. Instead, the data centered around the preservice teachers’ development of horticulture content knowledge, rather than their development of PCK for plant fertilizers. Five main themes surfaced that impeded the PCK development of preservice teachers during a Greenhouse for Teachers course.

Preservice Teachers Felt Less Self-Efficacious in Horticulture Content Knowledge

The six preservice teachers in this study all had minimal backgrounds in horticulture content, specifically in the topic of plant fertilizers. Although they did recall content-related courses taken in high school and college, there was an overall low perceived self-efficacy among the preservice teachers in relation to horticulture content knowledge. During her pre-observation interview prior to the beginning of the unit, Callie reflected on her past college courses and experiences, “I really don’t have any background in any kind of plant structures, fertilization, anything like that.” After the unit concluded, Callie’s self-efficacy had not changed much. When asked what areas of content she felt confident in, she replied,

Honestly, only animal science. That’s the only one that I would feel like I could go into the classroom [and teach] and really that’s kind of a stretch. Horticulture is getting there just because its bringing a lot of stuff back from high school that I did learn, but as far as being able to walk into a classroom and being able to teach a lesson, I think animal science would be the only one.

Ashley and Lindsey also expressed concerns with content knowledge levels related to horticulture and their ability to teach that content to future students. Ashley stated, “The fertilization part I don’t know a lot about at all”. Lindsey shared, “I feel like I’m not extremely confident in any area of agriculture”. The preservice teachers enrolled in the class did not express confidence in their
ability levels related to plant fertilizers content before or after the unit, making it difficult for PCK to develop.

**Preservice Teachers Possessed a Greater Desire for Horticulture Content Knowledge over Pedagogical Knowledge**

Another element that impeded the development of PCK in the Greenhouse for Teachers course was the preservice teachers’ personal desire for content knowledge procurement, rather than pedagogical knowledge or PCK. They expressed aspirations related to content knowledge acquisition during both the pre and post-interviews and classroom observations. I observed the preservice teachers asking questions related solely to developing content related knowledge. During an interview, when asked why she enrolled in the course, Marsha responded,

> Well since I am going to be an ag teacher, I’m most likely going to have a greenhouse. I figured it would be good to learn about greenhouses and have more knowledge about them, because really all I knew before was, yes, we have one, it controls the temperature, and you grow plants in it.

Even after being asked her overall goal for the unit, Marsha’s response was strictly content-related. “I’m hoping that I will have a better understanding for greenhouses and plants in general.”

Ashley described an earlier instance in the course when Dr. James presented ways future students of the preservice teachers could utilize what they were learning in a horticulture class within their Supervised Agricultural Experience Programs. She did not think class time should be spent on that topic. “I feel like we could have spent less time on that [Supervised Agricultural Experience Programs] and going ahead and gone to the greenhouse and got things, seed in and stuff like that”. The preservice teachers’ expressed desire for learning content knowledge over pedagogical knowledge, or even a combination of the two, could have negatively affected the development of PCK throughout the unit.

**Preservice Teachers Exhibited Development of Horticulture Content Knowledge and Mathematics Content Knowledge**

Although there was no substantial evidence that PCK was developed among the preservice teachers, it was clear that they developed some content knowledge related to the unit topic, plant fertilizers. During field observations, it was easy to observe the preservice teachers gaining content knowledge. Most of the class discussions for the two days of observation related to fertilizers and how to operate the fertigation system. They continuously asked questions of the instructor, Dr. James, that were specifically related to the content, rather than how to teach that content. When asked what information he gained from the unit, John focused mainly on content-related items.

> I learned how to find the rate of water soluble fertilizer, doing that math. I learned how to set the irrigation system where you can add fertilizer through it, the overhead irrigation. I really liked learning how to calculate the math part because I didn’t know how to do that before and it’s really useful to know how to do that.

There weren’t any preservice teachers who shared a pedagogical-based learning outcome from the unit, even when prompted by “What aspects of this unit, if any, contributed to your ability to teach this unit in the future?” and other similar questions. The second day of field observations also highlighted content knowledge development in horticulture. The class of preservice teachers was divided into groups, and each group was given a different greenhouse system. While rotating
through the stations, I observed the preservice teachers discussing how to work the systems, but there was no evidence or discussion of what strategies they could use to teach those systems or struggles in their future careers as agriculture teachers.

The first day of observations was used for whole-group discussion in the classroom. While observing on the first day, I noticed development of a different type of content knowledge. Along with horticulture-based content knowledge, the preservice teachers also developed mathematics content knowledge, specifically within the area of conversions. During the discussion, Dr. James mentioned a mathematics concept to the teachers called the “rule of 75”. Dr. James assumed the preservice teachers had heard of the concept before, however, there was not a single preservice teacher in the room who knew or understood the concept. Due to this lack of understanding, Dr. James focused his instruction on the “rule of 75”. This lack of background knowledge led to more time being spent on content knowledge development in both horticulture and mathematics.

Following my observations, I altered the post-observation interview questions to include discussion of the “rule of 75”. All participants admitted they had no prior knowledge of the math concept. When asked about the topic, Lindsey replied, “I’d never heard of it, so yeah, I was pretty lost too”. John had a similar response. “I had no idea what he was talking about, at all.” After the unit, however, the preservice teachers felt as if they understood the math-related content knowledge taught during the unit. Callie made this evident in her post-observation interview. “He taught us how to mix fertilizers, how to calculate certain requirements for different plants, so how each plant, what they need, and how to calculate that, and then how to actually mix it.” Content knowledge in horticulture and mathematics related to plant fertilizers were developed, but there was no real evidence of pedagogical development or PCK for the preservice teachers.

The Lack of Content Knowledge Foundation Inhibited the Development of PCK in Preservice Teachers

The preservice teachers’ lack of horticulture content knowledge before the unit, or even the course, and its inhibition of the development of PCK, was a fourth theme that emerged during the study. Analysis of the pre-observation interviews revealed a lack of content knowledge possessed by most of the preservice teachers before the start of the unit. Callie stated her lack of content background, “I don’t have an understanding [of plant fertilizers], so I really need everything I can get out of the class”. This suggested basic content knowledge of fertilizers would need to be taught. As a result, the majority of the time for the fertilizers unit was spent on developing basic content knowledge among the preservice teachers.

During the first day of field observations, I noticed the preservice teachers constantly asked content-related questions. The professor, Dr. James, spent most of his time during the unit answering content-related questions, and explaining material he expected the preservice teachers to already know. When Dr. James first mentioned the “rule of 75”, he realized the preservice teachers didn’t know as much as he thought. He asked John, “Where else do you see that [rule of 75]? John responded, “I haven’t”. The entire class had confused looks on their faces. Dr. James replied, “Alright that’s okay. Anybody ever seen that before?” When none of the preservice teachers reacted, he proceeded to explain the “rule of 75” to the preservice teachers.

The first day of the unit was spent in the classroom. Dr. James began the day by having the students review a model for experiential learning. This learning model was learned by the preservice teachers within the course, but it was not taught during the plant fertilizers unit. After a quick review, he introduced the topic of water-soluble fertilizers. From there, the discussion continued with numerous questions from the preservice teachers about how to calculate fertilizer
concentration and how to operate the dosimeter (a device that injects a small quantity of concentrated fertilizer solution into the irrigation line in a greenhouse). The questions initiated by the preservice teachers revealed a lack of content knowledge in horticulture and math, related to plant fertilizers, to build upon before the unit even began.

The second day of the unit, the class worked in groups to operate one of three different systems in the greenhouse. The time spent during class that day was again focused almost entirely on content knowledge development, because the instructor saw a need to for the preservice teachers to start learning the content at an introductory level. Following announcements, Dr. James began the discussion by recalling a question asked by Ashley at a previous class meeting. This question began the content-based discussion that would last the remainder of the observation time. The preservice teachers’ lack of content knowledge in plant fertilizers resulted in a lack of time for pedagogical skill development during the unit; therefore, the preservice teachers could not connect the content and pedagogical knowledge bases of fertilizers to develop PCK.

A Lack of PCK Developed, Despite the Purpose of the Course and Vision of the Instructor

The purpose of this study was to describe the preservice teachers’ development of PCK for the concept of plant fertilizers. Instead, there were factors throughout the unit that inhibited the development of PCK. Before observation of the fertilizers unit, there was an anticipation that preservice teachers would potentially feel confident and prepared about teaching agricultural content related to fertilizers when beginning their career as an agricultural education teacher. Preservice agricultural education teachers did not develop PCK for the concept of fertilizers.

Callie made it evident she learned the content material, but she did not make the connection to pedagogy needed to develop PCK. “I think that it [fertilizers] was taught to where we could understand it, but I’m not sure that I have a great foundation of how to teach that to other students.” Amy also thought she grasped the content of fertilizers, but she failed to connect the reason why the topic should be taught to her future students. “I don’t understand, like, I understand why we had to learn it, but it’s not really anything that we can teach. Because they can’t really mess with the fertilizer, because you can’t really trust a high school student to do it.” After the unit, Marsha was able to share numerous examples of content knowledge she gained from the two days of instruction; however, when asked if there was anything that occurred during the course of the unit that influenced her ability to teach this in the future, she replied, “I don’t really think there was any”. Overall, the development of PCK among preservice teachers during the plant fertilizers unit was virtually non-existent. The preservice teachers failed to see the connection of taking the content they already knew or learned during this unit and applying it to teaching future students.

Discussion

In this research, the original goal was to use grounded theory methods to explain the development of preservice agriculture teachers’ PCK for the concept of plant fertilizers. The emergent central phenomenon was an overall lack of PCK development during the unit, highlighted by five themes that impeded the development. This study has echoed the findings of related studies by reiterating the complex nature of PCK development (De Jong et al., 2005).

If a teacher does not possess PCK, he or she is more likely to have a low self-efficacy related to teaching that content area (Kola & Sunday, 2015). Interviews with preservice agriculture teachers in this study revealed their low self-efficacy levels in horticulture-related content. This lack of self-efficacy impeded PCK development. The preservice teachers felt as if they could not teach if they did not understand the content they were teaching. Pendergast, Garvis, and Keogh
Wooditch, Rice, Peake, & Rubenstein  

(2011) found that as a greater understanding of the teaching profession is gained, the self-efficacy level of preservice teachers declines. The first theme that impeded the development of PCK in this study supports this finding. The participants in this study had all taken at least two introductory-level education courses. It is possible their low self-efficacy stemmed from their budding understanding of the reality that comes with being a teacher. In addition, the preservice teachers had very little, if any, background in the content area of plant fertilizers. The experience that was mentioned by the participants included high school classes that, for most, took place three to four years prior to the Greenhouse for Teachers course. The lack of content related courses in the past could have contributed to their low self-efficacy, because they did not feel proficient in the content.

Similar to this study, Rice and Kitchel (2015a) discovered a lack of confidence in preservice teachers’ agricultural content knowledge at the University of Missouri. It is possible the lack of confidence and self-efficacy in plant fertilizers resulted in the preservice teachers’ desire for content knowledge, rather than pedagogical knowledge or PCK. A large amount of class time during the unit was used for the professor to stop and explain content-related terms and concepts. The focus on content knowledge development guided by their desire to gain fundamental fertilizer knowledge, could have led to the preservice teachers missing the pedagogical aspect of the unit or course entirely. Content knowledge is the foundation for PCK development, however, the learning does not stop there (Ozden, 2008). The preservice agriculture teachers entered the unit with a desire for content knowledge acquisition, and they attained that goal. However, just because they are now more confident in plant fertilizers content, does not mean they can effectively teach that material to future students. It is critical for preservice teachers to know and understand the subject matter being taught, but it is also important they know how to teach it to a diverse group of learners and are able to assess their learning (Gardner, 2006).

During the pre-observation interview stage, all the preservice teachers expressed a lack of content knowledge foundation for plant fertilizers. When compared to the post-observation interviews, this revealed that the lack of a content knowledge foundation impeded the development of PCK. More and more preservice teachers are entering agriculture education programs with a limited amount of content knowledge in various areas of agriculture (Rice & Kitchel, 2015a). Over half of the preservice teachers in the study felt as if they would not feel confident teaching a horticulture course to middle and high school students. They felt more confident in the agriculture areas in which they had a strong content background, such as animal science. According to the SS Department of Education (2013), agriculture teachers should be prepared to teach a wide variety of agriculture content areas. In this case, the professor of the Greenhouse for Teachers course had to take time to fill in the content knowledge gap of plant fertilizers, at the expense of the purpose of the unit, PCK development.

The development of PCK in preservice teachers is an extremely complex process (De Jong et al., 2005). This research was an attempt to exhibit that process of development, but instead highlighted several impediments to the process. The purpose of the unit was to develop preservice agriculture teachers PCK in plant fertilizers. There were inhibitors during the unit that stunted PCK development. Preservice teachers need to enter content-focused methods courses with a stronger background and understanding of the content knowledge associated with the subject matter at hand, so more time can be spent on combining the existing pedagogical and content knowledge to more purposefully form PCK.

Recommendations for Practice and Research

If preservice teachers are encouraged to understand PCK as a knowledge base, they will be more aware of the process they are undertaking (Kind, 2009). Therefore, it is recommended the
syllabus of the Greenhouse for Teachers course be structured to include exposure of PCK as a knowledge base. Instructing the preservice teachers on the basics of PCK could increase the likelihood that they understand what they are supposed to be gaining from the course. This could possibly decrease time spent exploring content knowledge and increase the time spent on PCK.

In addition to including PCK as a part of the syllabus, it is recommended the instructor of the course clearly exhibit the purpose of the Greenhouse for Teachers course at the beginning of the semester. Goal setting is an integral part of motivation and learning for all ages (Schunk, 2012). In the future, setting learning goals for the preservice agriculture teachers could increase the likelihood of PCK development. If the preservice teachers are told what is expected of them, and they make a commitment to meet those expectations, they are likely to alter their performance to work toward achieving those goals (Schunk, 2012). If goals for pedagogy, content, and PCK development are set in place, it could increase the likelihood of PCK development in preservice agriculture teachers in future Greenhouse for Teachers courses.

In addition to setting goals, the professor could incorporate the CoRe rubric designed by Loughran et al. (2004). The CoRe rubric is a valuable tool that can increase preservice chemistry teachers’ awareness of components that will eventually lead to their PCK development (Hume & Berry, 2011). If incorporated in the Greenhouse for Teachers course, the CoRe rubric could positively impact the PCK development of preservice teachers. The findings from Hume and Berry’s (2011) study demonstrate CoRe rubrics could be an ideal beginning for the growth of PCK, regardless of the educational backgrounds of the preservice teachers. It is recommended the instructor incorporate the use of CoRe rubrics to aid students in developing their PCK.

Field experience is a central component to effective teacher preparation (Darling-Hammond, 2006). It could be beneficial for preservice agriculture teachers in the Greenhouse for Teachers course to visit middle and high school classrooms where horticulture is being taught. As a part of the current course curriculum, the preservice teachers visit different schools to see the structures of greenhouses, but it is likely a visit to see teaching in those classrooms and greenhouses could be more effective for their PCK development. An increased exposure to teaching through early field experience could facilitate a connection between the pedagogical knowledge and content knowledge of the preservice teachers.

In addition to recommendations for components within the course, it is also recommended the course be placed in a later sequence of the preservice teachers’ preparation program. Most preservice agriculture teachers in the study expressed very little background in both pedagogical knowledge and horticulture content knowledge. Since the structure of the Greenhouse for Teachers course does not currently warrant any pre-requisite courses, it could be beneficial to place it later in the preservice teachers’ course sequence, after additional methods and curriculum development courses. Finally, a content related course, like Soils and Hydrology, could serve as a pre-requisite for preservice teachers enrolled in Greenhouse for Teachers.

It is also recommended more research be conducted to explore how PCK develops among preservice agriculture teachers. This study only focused on one unit within a single course at the SLGU. Since only one unit was represented, the same findings may not hold true for other units within the course. This study could be replicated with similar units and courses at the SLGU and other universities that engage in agriculture teacher preparation. It is also possible that studying PCK development in preservice teaching is too ambitious; maybe their development for PCK does not occur until later in the teacher education program. It is recommended more studies be conducted to determine the PCK development in practicing student teachers. Studies of this nature could better
inform the profession about when PCK development begins to be revealed, leading to more purposeful PCK development of preservice teachers.

References


Imaging Service-Learning in The Agricultural Education Magazine from 1929 to 2009: Implications for the Method’s Reframing and Use

Richie Roberts¹ & M. Craig Edwards²

Abstract

Service-learning’s (SL) discourse is written as a story of victory, achievement, and transformation in school-based, agricultural education (SBAE). The resources dedicated to improving both learning and communities through SL can be significant. Little work, however, has been put forth to examine this victory narrative’s underlying assumptions and implications. Therefore, the purpose of this historical investigation was to explore how SL was imaged in The Agricultural Education Magazine (The Magazine) from 1929 to 2009. Through the analysis of data, SL’s imaging in The Magazine appears to have been positioned through three distinct lenses: (a) societal, (b) pedagogical, and (c) social justice. In societally imaged SL, actors emphasized the importance of shaping young adolescents into productive citizens to meet the demands of their society. Meanwhile, the pedagogical lens emerged in response to calls for improved instructional effectiveness; as a consequence, practitioners and scholars outlined how SL could be used to enhance students’ academic achievement. The final lens, social justice, arose as a way to address equity, race, and privilege in agricultural education. Based on these conclusions, we offer implications and recommendations that may help reframe SL to respond to contemporary issues and trends in SBAE.

Keywords: historical research; imaging; pedagogy; service-learning; social justice

Introduction

During the past two decades, service-learning (SL) appears to have been depicted as an instructional method with the potential to transform schools, local communities, and even the world (Butin, 2015). By merging classrooms and communities, theory and practice, and cognitive and affective domains, SL can seemingly reshape the realities of education by addressing local problems through engaging students in real-world, service-based learning opportunities (Bringle & Hatcher, 1995; Eyler & Giles, 1999; Giles & Eyler, 1994). To that aim, Butin (2007) defined SL as “the linkage of academic work with community-based engagement within a framework of respect, reciprocity, relevance, and reflection” (p. 177). The SL literature teems with promises and stories of its transformative benefits (Kaye, 2010; Kraft, 1996). SL seems to speak to noble aspirations, such as duty and honor, which many perceive are missing in society (Billig & Welsh, 2004; Markus, Howard, & King, 1993). Often these possibilities are narrated as victory narratives – constructed to illuminate what SL could achieve in regard to diversity and pluralism (Butin, 2010, 2013; Gilbride-Brown, 2008). And, in many ways, SL has achieved these aims. For instance, more

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than 1,100 U.S. higher education institutions are now members of Campus Compact, a national coalition committed to SL; further, 100,000 plus K-12 schools report using SL to engage students every year (Campus Compact, 2016).

SL was established as a strategic instructional method with the potential to shift students’ theoretical orientations and worldviews (Butin, 2013; Kiely, 2005). To accomplish this, SL challenges the static conception of teaching and learning (Jones & Abes, 2004). For example, teachers, students, and community members become partners in the learning process and are freed from many of the hierarchical structures present in education (Green, 2003). As a result, SL may transform current educational labels such as student and teacher by calling into question the roots of knowledge, power, and identity (Swaminathan, 2007). The practice of SL, therefore, encourages practitioners to work against existing norms in education by embracing a captivating, often local, and impactful approach to learning.

SL’s promise also appears to have permeated the philosophical foundation of agricultural education (Roberts & Edwards, 2015). A foundation operationalized by an integrated three-circle model consisting of classroom/laboratory instruction, FFA, and Supervised Agricultural Experience (SAE), i.e., its “philosophical tenet” (Croom, 2008, p. 110). However, Roberts and Edwards (2015) proposed that SL could be the instructional tool SBAE instructors use to provide more impactful experiences manifested “through and between [the] programmatic dimensions” of the model (p. 227). Evidence increasingly demonstrates SBAE may be using SL for this purpose. For example, in 2007, the National FFA Organization adopted a SL initiative to better achieve the FFA motto (Slavkin & Sebastian, 2013). This change introduced service-based programs such as the Living to Serve and Food for All initiatives so SL would become more visible in FFA (Roberts, Terry, Brown, & Ramsey, 2016; Slavkin & Sebastian, 2013). More recent, the agricultural service-learning SAE was conceptualized as a distinct SAE category by the National Council for Agricultural Education (2018). Through these shifts, SL is positioned to become a powerful instructional tool for unifying SBAE students’ learning experiences. Arguably, a victory narrative for this instructional method has emerged in SBAE. However, SL also has a darker side.

Critics argue the method is merely “curricular fluff” that obscures essential elements of the learning process (Kiely, 2005, p. 5). For instance, although the goal of SL is to connect learning and service through reflective strategies, too often this is not the case (Clark, 2003; Flower, 1997). If devoid of apparent curricular influences and reflective activities, SL at best becomes an act of volunteerism and at worst a way to meet service requirements for graduation (Flower, 1997). Another critique of SL is that students begin to view the individuals served as others because they may appear weak or needy – a view which often contradicts the self-constructed identities of many young adults (Clark, 2003). The literature’s limited view of SL may also result from variant conceptual and theoretical views. For instance, Giles and Eyler (1994) suggested SL has roots in both Addams’ (1910) concept of noblesse oblige and Dewey’s (1938) theory of learning.

Addams (1910) argued individuals of privilege have a responsibility to help those less privileged – a view espoused by many contemporary practitioners of SL. Moreover, Dewey (1938) maintained schools should reflect communal life and prepare students to become productive members of a democratic society. Dewey (1938) posited these aims could be achieved by developing impactful learning experiences that allow students to work through relevant societal problems – a view subsumed in learning process models such as David Kolb’s (1984) experiential learning theory and Jack Mezirow’s (1991, 2000) transformational learning theory. These theoretical cornerstones seem to influence how teachers, students, and community partners operationalize SL. However, Jones and Abes (2004) contended that when SL is conceptualized as a way to help the needy, many students fail to recognize how their own power and privilege shape
such experiences. Moreover, too much focus may be placed on producing quality citizens while silencing the roles of curriculum and learning (Henry, 2005). Conversely, when SL is positioned from a purely experiential view, emphasis is placed on the learning outcomes of students while ignoring other features such as agency, community, and epistemological development (Jones, Gilbride-Brown, & Gasiorski, 2005).

Despite SL’s critiques, its discourse in SBAE is written as a story of victory, achievement, and transformation. And, as a result, the resources dedicated to improving both learning and communities through SL can be significant. To this point, Roberts’ and Edwards’ (2015) historical investigation of the origins of SL noted the method has been used in SBAE at pivotal moments to address “local problems and help[ed] to rejuvenate a sense of community” (p. 226). Little work, however, has examined this victory narrative’s underlying assumptions and implications. Such as Who has conveyed this story over time? What were the terms? Who benefitted? and What were the consequences? By peeling back the layers of SL’s historical imaging, perhaps SBAE can get to the core of its theory and practice.

By using the term imaging, we refer to the conceptualizations practitioners and scholars use to explain and depict a phenomenon (Koro-Ljungberg, 2016). Imaging is used to help individuals construct a conceptual understanding of abstract ideas and provides scaffolding for meaning-making. It can also shape how individuals speak of a phenomenon as they move through context-bound environments. As a consequence, imaging may promote a narrow view while ignoring a phenomenon’s many complexities. Therefore, imaging may influence how SL is operationalized, categorized, or even silenced in SBAE. A critical analysis of the pictorial and textual imaging of SL was warranted to assist the discipline in recognizing how normative traditions influence practice.

This study was positioned to investigate the historical imaging of SL in The Agricultural Education Magazine (The Magazine) by examining the “tangled and complex” (Salevouris & Furay, 2015, p. 43) context in which the imaging was situated. It is important to note, however, that SL has been “identified by a variety of names” (Roberts & Edwards, 2015, p. 226) throughout SBAE’s history. Mindful of this inconsistency, we did not disregard data sources if they used different words to describe the method considering the term service-learning was not introduced until 1967 (Marks, 1973). Instead, we included all of The Magazine’s displays of service-based learning as the historical record for our analysis.

Purpose, Significance, and Research Question

This study’s purpose was to explore how SL was imaged in The Magazine from 1929 to 2009. Specifically, this working of the past sought to illuminate how SBAE used depictions of SL to remember. And through this remembering, how the imaging of SL may construct our current understanding of this method while also shaping its future representations. Therefore, this study may hold valuable implications for research and practice. For example, by understanding the motives underlying the ways in which SL was imaged, perhaps new conceptual and theoretical progress could be made regarding its implications for student learning. Findings may also provide valuable insight into existing conceptualizations of SL influencing its practice in SBAE. By critiquing SL’s historical depiction, we can begin to question its underlying assumptions, and modify instructional behaviors as may be needed. The current study also sought to address Research Priority 6 of the American Association for Agricultural Education’s National Research Agenda, which calls for evaluation of delivery methods used to build “vibrant, resilient communities” (Graham, Arnold, & Jayaratne, 2016, p. 49). This research question framed the study: How was SL imaged in The Magazine from 1929 to 2009?
Methodology

We used historical research methods to guide this investigation. Historical research allows investigators to critique the roles of society and ideology on dominant discourses over time (Salevouris & Furay, 2015). This approach does not discriminate among sources of data. For instance, interviews, historical documents, visual artifacts, and video may be used to reconstruct the historical storyline for a phenomenon or issue (Salevouris & Furay, 2015); or, in the present study’s case, the imaging of SL. This research method also offers a broad framework to critique the socially and historically influenced narratives of individuals, groups, institutions, disciplines, and paradigms (Linde, 2009). In this form of inquiry, it is assumed individuals create the historical record as a way to remember. Researchers, therefore, must carefully analyze artifacts through numerous lenses, especially in regard to continuity, change, motives, and multiple causalities (Salevouris & Furay, 2015). To that aim, we placed particular emphasis on the many ways context, society, and philosophical viewpoints may have influenced the imaging of SL.

By following Salevouris’ and Furay’s (2015) recommendations and use of a critical constructionist (Denzin & Lincoln, 2008) lens, we (a) developed the research question, (b) collected data, (c) analyzed artifacts, and (d) constructed an integrative social critique of the issue. Their suggestions, however, are not linear in design; instead, we used such as anchor points while interacting with the methodology through a constellation of decisions, quandaries, and discoveries. An in-depth discussion of this process is offered in the manuscript’s procedures section. Of note, during the study’s early conceptualization, standards for rigor and trustworthiness were built into its design (Lincoln & Guba, 1985). For example, we offered context-rich descriptions while also being explicit about our uncertainties and biases to achieve credibility (Lincoln & Guba, 1985). We also kept a thorough audit trail of artifacts and our analytic procedures to promote confirmability. In regard to dependability, we emphasized the coherence of data sources by only collecting artifacts connected to the study’s purpose (Lincoln & Guba, 1985). However, due to the historical nature of this investigation, transferability was more difficult to achieve. As such, we were cautious to only engage data sources likely to be deemed useful by others interested in SL in the context of SBAE. Overall, Lincoln’s and Guba’s (1985) recommendations largely shaped how we collected and analyzed the study’s data.

Procedures

In our initial review of The Magazine, we noted many authors appeared to depict SL as a best practice for both teaching and learning. Through this engagement with our bounded source, we formulated an initial research question: What did SL mean to agricultural education’s discourse? Our working assumption was that SL’s imaging evolved over time. Therefore, we began to question why artifacts depicted in The Magazine were represented in particular ways. After questioning these factors, we reformulated our research question, i.e., How was SL imaged in The Magazine from 1929 to 2009? Published articles, photographs, and captions were key sources used to construct the study’s analytic storyline. We grounded our use of these artifacts in Enns’ and Martins’ (2015) justification for using The Magazine as a source of data. Enns and Martin (2015) provided three rationales for how The Magazine can serve as a quality historical source: (a) the magazine has maintained an open submission process for scholars and teachers from its inception; (b) the source usually features accompanying visuals with its articles; and (c) it has maintained broad readership among agricultural educators. Because of our emphasis on the depiction of SL in SBAE, we worked within and against common conceptions of SL by using this bounded source of data over an 81-year period.
Due to the vast number of articles published during the scope of this study, data collection and analysis was a recursive process over a five-month time span. Therefore, analysis was ongoing as we engaged artifacts in individual issues of *The Magazine*. During this period, we followed Enns’ and Martins’ (2015) procedures in which we bracketed volumes by decade. During this time, we also read through each issue of the magazine, identified artifacts, and constructed analytic memos to capture the *substance and spirit* of each source (Saldaña, 2015). In total, we collected 264 artifacts – including articles, photographs, and captions – published in *The Magazine* from 1929 to 2009. Because *The Magazine* was bracketed by decade, we did not pursue artifacts appearing after 2009 to avoid an incomplete period of analysis.

In general, authors and photographs were clearly identified in *The Magazine*; therefore, we could preserve important layers of nuance, detail, and context as the discursive storyline began to thicken. We then conducted two distinct reads of the data (Salevouris & Furay, 2015). In our first reading, we sought to illuminate the general meaning of each artifact to understand the message communicated. Next, our second reading involved critiquing the social and historical features of power, privilege, and culturally influenced ideology represented by each artifact. To accomplish this, we drew on Holley’s and Colyar’s (2009) concept of *focalization*. Focalization calls for researchers to use “the point of view from which the events unfold or the location from which the actors and characters are viewed” (Holley & Colyar, 2009, p. 681). Using focalization, we began to shift our analytic lens between “internal and external points of view” (Holley & Colyar, 2009, p. 682), which produced codes from a range of different perspectives. Then, to reduce the data, we scrutinized artifacts using thematic analysis (Riessman, 2008). To weave the narrative together, we followed Saldaña’s (2015) recommendation to apply analytic memoing to mobilize empirical assertions and propositions. Three empirically saturated themes – *societal, pedagogical, and social justice* – ultimately emerged. To situate this imaging, the findings section presents our social critique while illuminating implicit discourses existing in the pages of *The Magazine*. Table 1 outlines the artifacts analyzed by decade and theme.

### Table 1

**Artifacts from The Agricultural Education Magazine (1929 – 2009)**

<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Volume(s)</th>
<th>Societal</th>
<th>Pedagogical</th>
<th>Social Justice</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1929</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>1930 – 1939</td>
<td>2 – 10</td>
<td>11</td>
<td>6</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>1940 – 1949</td>
<td>11 – 20</td>
<td>35</td>
<td>9</td>
<td>1</td>
<td>45</td>
</tr>
<tr>
<td>1950 – 1959</td>
<td>21 – 30</td>
<td>32</td>
<td>15</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>1960 – 1969</td>
<td>31 – 40</td>
<td>10</td>
<td>4</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>1970 – 1979</td>
<td>41 – 50</td>
<td>19</td>
<td>7</td>
<td>5</td>
<td>31</td>
</tr>
<tr>
<td>1990 – 1999</td>
<td>61 – 70</td>
<td>8</td>
<td>11</td>
<td>4</td>
<td>23</td>
</tr>
<tr>
<td>2000 – 2009</td>
<td>71 – 81</td>
<td>5</td>
<td>29</td>
<td>3</td>
<td>37</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>81</strong></td>
<td><strong>136</strong></td>
<td><strong>101</strong></td>
<td><strong>27</strong></td>
<td><strong>264</strong></td>
</tr>
</tbody>
</table>
Findings

Through the analysis of data, three distinct lenses of SL emerged: (a) societal, (b) pedagogical, and (c) social justice. The lenses illuminate how the agricultural education discipline chose to portray SL in *The Magazine*. They do not tell SL’s complete story, rather the themes offer an important glimpse into the complexities of its imaging in SBAE during an 81-year period. The findings section, therefore, strives to draw distinctions among the three lenses of SL appearing in *The Magazine*. Each theme is also knit together by a common thread of motive, which is woven throughout our integrative critique of the findings (Salevouris & Furay, 2015).

A Societal Lens

Through societally imaged depictions, the practice of SL focused on shaping young adolescents into productive citizens based on society’s demands. As a result, instruction was attuned to foster social sensitivity to promote a cooperative, mutually beneficial culture. From this view, the motive to employ SL appeared to stem from a desire to create moral citizens prepared to address longstanding community engagement and development needs.

Just before the financial crash of Wall Street in 1929, SBAE instructors recognized the need to engage students in their communities (Ekstrom, 1929; Hamlin, 1929; Mobley, 1929). At the time, instructors emphasized that moral education should permeate all aspects of the curriculum (Ekstrom, 1929; Mobley, 1929). In response, state agricultural education staff in Georgia responded by initiating community improvement contests to imbue a spirit of service in students (Hamlin, 1929). This statewide initiative motivated students to use the skills developed through agricultural education to rethink their roles as citizens to make a positive difference in communities. Hamlin (1929) summarized the outcomes:

A summary of all the reports made by the schools [showed] . . . that the boys in the contest built 87 poultry houses and 144 hog-houses. . . . boys set out 3,982 shrubs and 4,744 fruit and nut trees. They built and repaired 3,868 terraces; built 1,946 rods of fence; sowed 2,102 acres to legumes; turned under 848 acres of cover crops. Two hundred ninety-three of the boys treated their planting for disease and 918 inoculated legume seed. In 49 homes running water was installed in kitchens; 29 homes were screened, and 25 sanitary toilets were built. (p. 13)

On first glance, Hamlin (1929) appeared to communicate the outcomes of a competition-based, service initiative. However, when questioning the context and terms surrounding the development of this excerpt, it is important to situate the report in its historical context. The report appeared only slightly more than a decade after the United States had entered World War I (Urban & Wagoner, 2014). And the war effort had a profound influence on schooling during that period. Teachers and students actively supported the war effort through civic engagement and activities such as the Student Army Training Corps (Taft, 1974). As a consequence, an expectation was that education should produce loyal citizens prepared to do their part in society. Therefore, Hamlin’s (1929) motive to publish could be interpreted as an attempt to document that agricultural educators were doing their part to fulfill expectations. This societal influence continued well into the 1940s, as agricultural education students continued to use their knowledge and skills to contribute to home front efforts supporting the nation’s involvement in World War II [WW II] (Cunningham, 1942; James, 1944; LeBeau, 1942; Peeler, 1943; Potter, 1943; Walters, 1945; Woodlin, 1943). Students grew victory gardens and animals, collected milk and eggs, canned fruits and vegetables, recycled and repurposed scrap metal, fundraised to purchase war bonds, established local cooperatives, and used metal and fabrication skills to construct canneries and other buildings dedicated to the war
effort (Cunningham, 1942; James, 1944; LeBeau, 1942; Peeler, 1943; Potter, 1943; Walters, 1945; Woodlin, 1943). For instance, SBAE students from North Carolina used their skills to assist at a poultry processing plant as part of the war effort (see Figure 1).

Across this theme’s storied terrain, expectations for civic engagement appeared to continue to influence SBAE’s curriculum well into the next several decades (Bach, 1954; Bachman, 1981; Calhoun, 1957; Cummings, 1957; Daniel, 1986; Edman, 1953; Garrison, 1979; Grey, 1957; Jewell, 1979; Menoher, 1957; Ogles, 1950). This discovery was surprising considering progressive approaches, such as SL, came under attack during the period (Ravitch, 2010). For example, Bestor (1952) issued a damaging blow against progressive educators by declaring their pedagogical techniques were anti-intellectual and could even harm the schooling of children. Moreover, with the Soviet Union’s launch of the Sputnik satellite in 1957, progressive education approaches began to diminish due to the United States’ renewed commitment to science and mathematics in public schools (Zimmerman, 2002). However, the discursive patterns in The Magazine painted a much different picture of this era for SBAE. In fact, 50 artifacts were mobilized for analysis from the 1950s (see Table 1). For example, Grey (1957) highlighted students from Bremond, Texas who created a monument to promote their program while also enhancing the community’s appearance. Given The Magazine’s strong evidence contradicting the dominant discourse of progressive education’s decline, it is important to reflect on the philosophical tenets of SBAE. As such, we revisited the artifacts and noted a majority of the activities highlighted had a strong focus on students applying principles of science, technology, engineering, and mathematics (Calhoun, 1957; Cummings, 1957; Grey, 1957; Walters, 1951), or, in today’s parlance, STEM. Therefore, perhaps SL was used as a way to uphold the traditions of SBAE programs while also responding to societal shifts calling for more attention to students learning mathematics and science. By 1971, however, progressive approaches began to regain momentum in U.S. public education (Urban & Wagoner, 2014).

Influenced by the words living to serve appearing in the National FFA Organization’s motto, SBAE’s culture began to evolve with the introduction of a new program, Building Our American Communities [BOAC] (Reese, 2003). BOAC offered a broad framework for instructors to incorporate service-oriented projects into their curriculum (Bachman, 1981; Daniel, 1986; Garrison, 1979; Jewell, 1979; Reynolds, 1981). Projects emerging from BOAC initiatives were wide-ranging. For example, The Magazine highlighted activities involving students participating...
in the application of chemical fertilizer for community members, service through turf and grass management efforts, as well as the construction of outdoor classrooms and community parks [see Figure 1] (Bachman, 1981; Daniel, 1986; Garrison, 1979). The influence of BOAC initiatives on SBAE should not be understated. The program appeared to influence its culture well into the 1990s until it was replaced by new service initiatives such as Food for America and the youth mentoring program, Partners in Active Learning Support (PALS). If the first SL theme is conceptualized through a societal lens, a range of activities appear to have shaped its imaging in The Magazine. However, no single influence could be identified; instead, the motives behind SL’s use appeared to have ebbed and flowed with dominant societal trends. Nevertheless, at this lens’s core was the concept or ideal of producing engaged citizens (Adams & Clark, 2009; Daniel, 1986; Edman, 1953).

A Pedagogical Lens

The second theme, pedagogical, first emerged in The Magazine in the 1940s (Cook, 1947; Deems, 1947; Evans, 1945; Harper, 1949; Naugher, 1946). The motive underlying this conceptualization seemed to be improving the systematic delivery of SL as a method of instruction. Contributors, therefore, clarified how to align service activities with the curricular aims of SBAE to enrich student learning. Similar to the previous theme, SBAE programs across the United States created initiatives calibrated to assist with the nation’s WW II efforts. However, many of the efforts were sustained after the war, especially in regard to school canneries and the teaching of agricultural mechanics initiatives (Deems, 1947; Evans, 1945; Naugher, 1946). Although these programs appeared to be societally influenced, some key actors recognized a need to outline the learning value associated with the activities of students and community members while also offering suggestions for improvement (Clements, 1945; Deems, 1947; Naugher, 1946). Evans (1945) explained how a WW II community cannery initiative led by the Halfway, Oregon program opened her eyes to new methods and techniques.

When our School Community Cannery was first proposed, some of us were ‘Doubting Thomases.’ We were so used to the old way of canning over a hot stove that we could not accept the new and better way until it had been tried. Our vision was impaired but now we see the light [emphasis added]. (Evans, 1945, p. 144)

At the close of the 1940s and beginning of the 1950s, educational reformers began to emphasize a philosophical commitment to life adjustment curriculum (Fraser, 2014). The intent of this curricular emphasis was to enhance the lives of people and improve society through educational training to bolster the personal knowledge and skills of individuals so they could thrive in an evolving society (Fraser, 2014). Although this educational movement was not broadly implemented throughout American public schooling (Urban & Wagoner, 2014), this philosophy may have influenced aspects of SBAE. For instance, in this period, contributors to The Magazine emphasized the instructional aspects of SL such that related outcomes would improve the lives of students and their communities (Edmon, 1953; Roy & Dale, 1960; Scott, 1947; Sutphin, 1979). In this regard, Agan (1954) posed critical questions for agricultural educators to consider when emphasizing citizenship development through students’ cooperative, service-based activities. In addition, Urban (1966) stressed the need for instruction before students engaged in a “chore service” (p. 152) for local farmers to ensure they experienced impactful learning outcomes. As a result, students were more likely to acquire basic skills before implementing such in a service activity. In accord, Sutphin (1979) encouraged agricultural educators to negotiate students’ learning objectives with community cooperators to ensure expectations adequately aligned with the local context. Through this increasingly critical view of the method, contributors were stressing the need for academic rigor when using SL while also aspiring to improve society.
As SBAE progressed into the 1980s, it faced many new challenges. With publication of the report *A Nation at Risk* also came declining enrollments and the discipline faced increased scrutiny to place more emphasis on academic content and the associated learning value of agricultural education courses (McKim, Balschweid, Velez, & Lambert, 2016). About this time, contributors to *The Magazine* began to feature approaches emphasizing student learning across all three domains of SBAE’s three-component model, and strategies for improving the delivery of SL appeared to gain popularity during the next several decades. In particular, Lelle (1991), Connors (1992), and Jones and Rayfield (2009) asserted SBAE students could use SL as a way to fulfill their SAE requirements. Moreover, Tarpley (2003) argued SL should be infused into SBAE via FFA chapters’ programs of activities (see Figure 2). Other contributors to *The Magazine* (Swan, 2006; Woods, 2002) stressed the need for reflection to connect students’ learning across SBAE’s programmatic dimensions.

![Figure 2. Service-learning as a component of a FFA chapter’s program of activities. Reprinted with permission from “Service-learning for Pre-service Teachers” by R. Tarpley, 2003, *The Agricultural Education Magazine*, 75(5), p. 27.](image)

Although the pedagogical lens did not surface in *The Magazine* until the 1940s, it is presumed to have played an important role in shaping SL’s imaging and practice in SBAE. By offering insight into the delivery of SL, the authors provided teachers with guidance about how to effectively use the learning method while navigating the social and cultural trends influencing their programs.

**A Social Justice Lens**

The final theme, a social justice imaging of SL, emerged as a way to embolden the voices of disempowered individuals and marginalized populations in SBAE (Downey, 1985; Flowers, 1946; Hickson, 1950; Kortesmaki, 1970; Ortiz, 1968; Phillips & Dormody, 1993; Rees & Iverson, 1993; Smith-Wong & Baker, 1994). Through this conceptualization, the motive emanating the use of SL was to enable students to confront issues and problems associated with the imbalances of power in society while also harnessing the resources necessary to enact social change. Although SL is often depicted as a harmonious learning method promoting charitable values, when viewed from a social justice lens, it can also demand respect, reciprocity, and agency for students and community members. This view holds the potential to promote social justice through action while explicitly working to bring about change. The framing of SL from a social justice stance seems to have been first depicted in *The Magazine* during the 1940s. As evidence, Flowers (1946) highlighted a vocational agriculture teacher from Alamo, Tennessee who was troubled by the poor living conditions of African-Americans in his community. He explained:

*Roberts & Edwards*  
*Imaging Service-Learning...*  
*Journal of Agricultural Education*  
*Volume 59, Issue 3, 2018*
This young Negro teacher was sincerely disturbed by the low living standard in which his people were existing, and he resolved to do all in his power to help them improve their conditions. With the help of his supervisors, his plans were drawn, problem by problem, to include the use of county, state, and government agencies. (p. 95; see Figure 3).


As a result, vocational agriculture students were able to assist their community by applying their agricultural mechanics, horticulture, marketing, and communications skills through a community-wide effort aimed at improving the living conditions of African-Americans. During the next several decades, glimpses of social justice-oriented SL were found in The Magazine. To this end, contributors depicted SL efforts designed to help African-Americans, homeless youth, the mentally and physically disabled, as well as marginalized populations in lesser developed countries (Byram, 1965; Cicchetti, 1975; Donahoo, 1953; Hickson, 1950; Hopkins, 1982; Kortesmaki, 1970; Ortiz, 1968).

Despite the persistence of racial and social discrimination, SL in SBAE continued to bring attention to these problems, especially in regard to race and poverty. Smith-Wong and Baker (1994) articulated how urban, African American students in Los Angeles used a service-oriented entrepreneurship program to address local inequities. The program, Food from the Hood, facilitated students growing a variety of crops and marketing their produce at farmers’ markets in and around Los Angeles (see Figure 3). Food from the Hood also provided sustenance for the underprivileged because the students donated a portion of their crop to the homeless. Smith-Wong and Baker (1994) explained: “Under a student mandate, students gave 25% of the produce to the homeless. By the end of the year the group had earned $1,500. The money was used to help send three student participants to college” (p. 6). The data demonstrated that if SL was examined through a social justice lens, teachers, students, and community members often questioned or challenged the public’s framing of race, class, and privilege. To accomplish this, many SL projects sought to create a space in which students could begin to comprehend the importance of fairness and achieving equality for all citizens of their respective communities (Flowers, 1946; Kortesmaki, 1970; Rees & Iverson, 1993; Smith-Wong & Baker, 1994).
Conclusions and Implications

Practitioners and scholars have used *The Magazine* as a venue for advancing important *societal*, *pedagogical*, and *social justice* messages through the use of SL in SBAE. Many contributors throughout *The Magazine*’s history depicted the method as noble, fulfilling, and deeply impactful. As an outcome, *The Magazine* contributed to SL’s *victory narrative* in SBAE by communicating a *promise of transformation* for students, teachers, and communities. Three lenses emerged as SBAE responded to emerging trends in American society. For example, in response to societal issues such as the Great Depression and WW II, SL was depicted as a way students could use their education to contribute to society’s needs (Cunningham, 1942; Ekstrom, 1929; Woodlin, 1943). This lens emphasized the impact of the *service* provided. Artifacts positioned from the societal lens perspective often reported the effects that students’ service had on *their local communities* (Daniel, 1986; Grey, 1957; Hamlin, 1929). Therefore, this finding supports Roberts’ and Edwards’ (2015) claim that SL in SBAE “[a]s instrumental in solving local problems and helping to rejuvenate a sense of community” (p. 226).

The pedagogical lens seemed to gain prominence in *The Magazine* in response to increased calls for academic rigor and accountability in K-12 education. For instance, in light of the report *A Nation at Risk* and declining enrollment trends, many educators began to discontinue progressive educational approaches to accommodate more curricular space for science and mathematics (Fraser, 2014; McKim et al., 2016; Urban & Wagoner, 2014). However, *instead of rejecting SL*, contributors to *The Magazine* appeared to demonstrate that *space* existed for learning and *service* in the context of local communities (Connors, 1992; Fear, 1987; Lelle, 1991; Nelson, 1994; Pearson, 1984). Articles viewed through the pedagogical lens focused on *best practices* involving the method to improve student learning (Jones & Rayfield, 2009; Nelson, 1994; Swan, 2006). As a result, SL was imaged as a way students could develop through classroom and laboratory instruction, SAE projects, and FFA activities by more firmly connecting their learning to service opportunities in local communities (Connors, 1992).

Based on the data analyzed, the social justice lens appeared to emerge as tensions associated with race began to pervade U.S. society. It spoke to the importance associated with helping students understand the social impacts of *inequality, racism, and privilege* (Byram, 1965; Donahoo, 1953; Hopkins, 1982; Kortesmaki, 1970). Therefore, social justice positioned SL as a method of instruction that reframed relations of power while also questioning the status quo. In this regard, the imaging of marginalized students in *The Magazine* was often framed from a perspective of endorsing tolerance of different cultures, bringing attention to those students’ struggles, or calling for change by championing for improved resources and services (Downey, 1985; Flowers, 1946; Kortesmaki, 1970; Smith-Wong & Baker, 1994)

Recommendations and Discussion

By questioning the imaging of SL in *The Magazine*, possibilities for its future practice and related research become clearer. First, we must more deeply understand the outcomes and consequences associated with *doing SL*. This study highlighted three distinct ways SL was imaged. However, more research is needed to understand the micro-politics, attitudes, and practices of teachers, students, and community members as they engage in SL. For example, how can the framing of SL endeavors influence aspects of *voice, assessment, and learning* in SBAE? Moreover, how are teachers’, students’, and stakeholders’ views on social norms, such as diversity and inclusion, shaped by SL experiences when examined through these different lenses?
From our analysis of the data, SL’s discourse formed a rich narrative. More effort, however, is needed to understand how this discourse works as a storyline in SBAE. To this aim, how does SL’s imaging shape the ways practitioners talk, conceptualize, and practice the method today? Future research should also explore the consequences of positioning SL endeavors through one lens instead of another. In this regard, if a teacher champions SL as a way to promote citizenship, the carried assumptions and implications will likely differ from a SL activity with academic learning as its primary aim. We recommend professional development opportunities be created to assist practitioners with understanding how the unique framing of SL may support and limit its outcomes. In practice, SL can be difficult and time-consuming to implement (Banerjee & Hausafus, 2007; Kaye, 2010). It takes considerable resources and planning before students may begin to have impactful SL experiences. Therefore, by examining educators’ motives perhaps their use of SL can be augmented to increase the likelihood of achieving SBAE’s learning objectives. This warrants additional research questions: Are the motives purely outcome driven? Are such culturally or politically charged? Are the motives recognition based? Could instructors’ decisions to use SL as a method of instruction be rooted in deeper ontological and epistemological beliefs? And, do practitioners perceive the resources dedicated to SL activities are worth the cost? By exploring these questions, perhaps teachers’ capacities for delivering more impactful, engaging, and high-gain SL experiences will be improved.

By examining how SL has been imaged in The Magazine, we now understand better where we have been and can begin to advance more theoretical and conceptual discussions. Because motives appear to influence SL’s imaging, we argue more attention should be placed on the role social processes play in shaping SL’s practice and resulting outcomes. By more deeply understanding the “production and reproduction of relationships between people and things, and people and practice” (Sheehy & Leander, 2004, p. 95), we theorize new, thought-provoking possibilities may exist. For example, perhaps SL could be reframed to serve as a more powerful complement to SBAE. Recent literature suggests agricultural education has taken a critical turn by questioning the influence of gender, race, power, and ideology (Enns & Martin, 2015; Kelsey, 2007; Martin & Kitchel, 2013, 2015; Roberts, Edwards, & Ramsey, 2016). These investigations have led to increased calls for exploring inclusive approaches that may create a more equitable and inviting socio-cultural climate in SBAE. Perhaps SL could serve as a mechanism for facilitating such change.

References


An Analysis of Education-related Policies Regarding the Participation Potential of Homeschool Students in Agricultural Education and FFA

Matthew J. Kararo¹ & Neil A. Knobloch²

Abstract

The number of parents in the U.S. choosing to homeschool their children is steadily growing. With a strong demand for college graduates in food, agriculture and natural resources careers, there is an opportunity for homeschooled high school students to explore agricultural careers and develop entrepreneurship and leadership skills through Agricultural Education and FFA programs. The homeschool population has largely been an untapped market of potential participants for Agricultural Education and FFA programs. This is important because increasing access for all students, including non-traditional students, is an organizational goal for National FFA. Yet, few researchers have investigated current and potential intersections of school-based Agricultural Education, FFA participation, and homeschoolers. This study analyzed the potential of homeschool student participation in secondary agriculture programs, specifically school-based Agricultural Education and FFA, for all 50 states. Each state’s potential with regards to homeschool student participation was determined by a qualitative policy analysis utilizing evaluation coding. States were delineated into categories based upon their part-time public school enrollment policies, homeschooling regulations, and FFA membership requirements as defined in state FFA constitutions. Current program participation pathways were defined as well as strategies for increasing homeschool student awareness of and access to Agricultural Education programs and FFA membership.

Keywords: Agricultural Education, FFA, homeschool, policy

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Introduction

School-based Agricultural Education (SBAE) programs are framed utilizing a three-component model of classroom instruction, FFA, and supervised agriculture experiences (SAE) (Croom, 2008; Phipps & Osborne, 1988). This philosophical Venn diagram targets the development of the entire student, including not only content knowledge and understanding, but also leadership

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and social skill development (Newcomb et al., 2004). Leadership and social skill development (aka, soft skills) can be broken down further into specifics such as teamwork, interpersonal communication, cooperation, conflict management, higher-order thinking skills, authentic self-evaluation and self-discipline, and learning through authentic instruction such as problem-based scenarios (Knobloch, 2003; Talbert et al., 2005). The three integrated SBAE program components (i.e., classroom instruction, FFA, and SAE) align with a foundational educational approach of experiential learning (Phipps & Osborne, 1988; Roberts, 2006).

As part of the three-component SBAE program model, FFA (aka, Future Farmers of America) was founded on the principle of developing leadership and interpersonal skills as an intracurricular activity (FFA History, 2015). Leadership development is important in a democratic society because there is a perpetual need for generations of new leaders (Ricketts et al., 2008). Additionally, in a global economy, leadership skills are a competitive advantage when seeking employment, as employers desire hiring leaders (Job Outlook 2013, 2012). In response to the evolving nature of agriculture and stakeholder demographics in the 21st century, SBAE programs and accordingly FFA are broadening their content foci to appeal to a more diverse student population and increase enrollment by providing desirable leadership development opportunities to youth (Conroy & Kelsey, 2000; Frick et al., 1991; Kahler, 1988; Newcomb et al., 2004; Powell et al., 2008). One potential target population for SBAE and FFA is homeschool students, but the intersection of homeschool students and Agricultural Education is understudied and has not been mentioned in Agricultural Education publications in over a decade (Frick & Brennan, 1998; Mannebach, 1998; Walls et al., 2001) despite evidence in the media that homeschool students are participating in Agricultural Education programs and are active FFA members (Johnson, 2012; Massey, 2015).

Nationally, homeschool enrollment increased 62% from 2003 to 2012 (Snyder, de Brey, & Dillow, 2016) and raw numbers of homeschool students may now exceed two million children (Clemmitt, 2014; Kunzman, 2005; Ray, 2011; Romanowski, 2001), resulting in an increasing number of homeschool families utilizing local public school resources as part of their parentally prescribed curricula (Planty et al., 2009). Homeschool students represent a potential growth audience for Agricultural Education and FFA (Frick & Brennan, 1998; Weik, 2015). School-based Agricultural Education programs and FFA have the opportunity to be more inclusive and address local community needs by providing potential program participation pathways to local homeschool students. Although research studies investigating the academic performance of homeschool students exhibit methodological flaws (Gaither & Kunzman, 2013), when cautiously interpreted, these studies can provide evidence that homeschool students may perform at least as well as demographically equivalent public school students (Ray, 1997, 2000, 2010). Additionally, homeschoolers typically have parents who are involved in their children’s education (Ice & Hoover-Dempsey, 2011). Parental involvement and academic achievement are both valuable qualities for potential SBAE program and FFA chapter participants. Agricultural Education can appeal to home educators by emphasizing the fundamental programmatic philosophy of developing the student into a lifelong learner (Dailey et al., 2001). The goal of lifelong learning is compatible with the educational approach of many home educators, who want learning to occur in an integrated and sustaining way (Van Galen, 1991).

Traditionally, SBAE programs and FFA chapters have been exclusively accessible to students enrolled in and attending on a full-time basis public schools that offer such programs (Croom, 2008; Talbert et al., 2005). Despite potential barriers, some SBAE programs have expanded to include the surrounding homeschooling community. Alaska and North Carolina are examples of states that have a developed model that provide homeschool students with Agricultural Education and FFA membership. This is accomplished by offering state-approved Agricultural
Education curricula to home educators and separate homeschool FFA chapters (Massey, 2015; Teacher Directories, n.d.). A documented example of homeschool students participating in Agricultural Education and FFA programs via another pathway in other states is through part-time public school enrollment and membership in the public school FFA chapter (Brown, 2015; Johnson, 2012; Kittle, 2011; Weik, 2015).

The National FFA research agenda for 2013-2018 identified a top priority for the organization being accessibility and inclusiveness of FFA and that it is “imperative that barriers be removed in order to engage all young people enrolled in agricultural education in the National FFA Organization’s mission of developing premier leadership, personal growth, and career success” (Crutchfield, 2013, p. 1). Expanding program access is important because previous research has shown that FFA achieves its leadership development principle and can be a valuable program for adolescent development. There is value even if those benefits are self-perceived leadership development (Rutherford et al., 2002) or as broad as satisfying the needs of program participants (Reis & Kahler, 1997), such as providing a sense of belonging (Croom & Flowers, 2001). FFA membership also offers an application of life skills, such as public speaking, personal responsibility, and self-discipline, in addition to leadership development opportunities (Croom, 2008; Dailey et al., 2001). The development of youth leadership adheres to the holistic and authentic nature of Agricultural Education, and is an approach that appeals to many home educators (Van Galen, 1991).

One key to understanding Agricultural Education program and FFA membership access and knowing how to expand access and market to more potential program participants and members in the future is by identifying and interpreting relevant current policies acting as gatekeepers. However, no studies were found that identify and summarize relevant state-level education policies regarding homeschool students’ part-time enrollment in public schools, state-level homeschooling regulations, and state FFA constitution membership language.

**Conceptual Framework**

The study was conceptually framed around three state-level policies (see Figure 1): (1) Part-time public school enrollment eligibility, (2) homeschooling regulations, and (3) membership requirement language in state FFA constitutions. First, there are three types of part-time public school enrollment policies based on current compiled data sources (Current Homeschool Law, 2016) and confirmed by consulting cited legislation: (1) Access to part-time public school enrollment mandated at the state level, (2) part-time public school enrollment prohibited at the state level, or (3) power delegation by states to local school districts that define their own part-time public school enrollment policy. Second, four categories of state homeschooling were defined based on a combination of definitions from the Home School Legal Defense Association (HSLDA) (Smith & Farris, 2016) and the Coalition for Responsible Home Education (CRHE) (Current Homeschool Law, 2016): (1) High regulation, (2) moderate regulation, (3) low regulation, and (4) no notice required. In the same way data accuracy for the first policy was reaffirmed, state homeschooling regulation policies compiled by the HSLDA and CRHE databases were confirmed by consulting cited legislation. Finally, four categories of membership requirement language were defined based on current state FFA constitution language: (1) Required enrollment in SBAE course and SAE, (2) required enrollment in SBAE course or SAE, (3) either of the previous statements with a clause allowing for private or homeschool chapters and/or members, and (4) unique membership requirement language not seen in more than one state.

The conceptual framework of Agricultural Education and FFA program participation potential for homeschool students in each state was a function of the three policies around which
this study was framed. Therefore, depending on current policy within each state, the policy that was most relevant to Agricultural Education and FFA program participation potential may be different. However, in general, because of currently observed program participation pathways, it was conceptualized that the most important “gatekeeper” policy is part-time public school enrollment eligibility, followed by homeschooling regulations, and finally state FFA constitution membership eligibility language.

Figure 1. Conceptual framework of Agricultural Education and FFA program participation potential being filtered through the lenses of national, state, and local policies.

The history of homeschooling in the United States informs how current policy regarding both part-time public school enrollment and homeschooling regulations came into existence, but an exhaustive historical description was beyond the scope of this study (see Gaither, 2008 for an excellent summary). For the purposes of this policy analysis and the conceptual framework, the most important piece of history was that the United States Supreme Court has never directly addressed homeschooling, but rather acknowledges the rights of both parents to determine the education of their children and states to regulate schooling (Kunzman, 2012). The result was a menagerie of part-time public school enrollment eligibility and homeschooling regulations in each state which made those two policies a fundamentally necessary part of the analysis framework.

The third piece of this policy analysis framework was state FFA constitution language regarding membership eligibility requirements. In 1950 and 1998, the U.S. Congress granted the FFA a Federal Charter based on Public Laws 81-740 and 105-225, respectively (National FFA Organization, 2015). These public laws state that FFA is an integral part of public instruction in agriculture and the federal charter “provides the foundation that makes FFA an integral part of the 3-Component Model of School-Based Agricultural Education” (National FFA Organization, n.d., n.p.). According to the National FFA Constitution (2012), a student (grades 7-12) must be enrolled in a secondary Agricultural Education program to be eligible as an active member in the FFA. The National FFA Constitution states, “to become an active member and retain membership, a student must: While in school, be enrolled in at least one agricultural education course during the school year and/or follow a planned course of study; either course must include a supervised agricultural experience program, the objective of which is preparation for an agricultural career” (p. 3). Moreover, a state FFA constitution cannot conflict with the National FFA Constitution to be considered in good standing with the National FFA Organization, and “the National FFA Board of Directors shall have the power to suspend the charter of any state association which violates the
National FFA Constitution and Bylaws” (National FFA Organization, 2012, p. 2). As each state FFA association navigates inclusiveness and accessibility to increase membership, there can be tension in how policy language of the National FFA Constitution is interpreted.

**Purpose**

The purpose of this study was to describe education-related policies regarding the participation potential of homeschool students in the Agricultural Education and FFA program for each of the 50 states.

**Methods & Procedures**

A qualitative policy analysis using evaluation coding (Saldaña, 2013) examined three specific educational policies (e.g., part-time public school attendance; homeschooling regulations; and state FFA constitution membership language) in all 50 states in order to determine how current policy could impact Agricultural Education and FFA program participation potential for homeschool students. Although Agricultural Education and FFA chapters exist in U.S. territories as well, this study was restricted to the 50 states due to the unique nature and history of homeschooling laws and legal precedents in territories.

An iterative process for analyzing policies was implemented in three phases. Phase one was identifying and compiling data for the three targeted state policies while conducting a preliminary analysis. Policies were selected for inclusion in this study based upon reading the research literature regarding homeschooling as an education option and its relationship with the surrounding educational community, particularly with regards to public school intracurricular and extracurricular programs (e.g., Kunzman & Gaither, 2013). Additionally, news stories regarding homeschool student participation in Agricultural Education and FFA (e.g., Brown, 2015; Johnson, 2012; Kittle, 2011; Weik, 2015) were analyzed and policies identified that contribute to program access in those cases. States with similar or identical language were grouped together with regards to each policy. State part-time public school attendance policy and homeschooling regulation policy was identified by consulting the HSLDA and CRHE websites (Current Homeschool Law, 2016; Smith & Farris, 2016) and confirmed by finding referenced legislative citations in the public record. All state FFA constitutions were found either in an online public archive on the state’s FFA association website, or obtained via electronic communication with national or state-level FFA leadership.

Phase two involved the development of a rubric (see Table 1) based upon differences observed within each of the three policies at the state level and assigning relative potential access values to each piece of policy data. This included the accessibility of part-time public school enrollment, extent of homeschooling regulations, and potential inclusiveness of state FFA constitution membership language for each state.
Table 1

Policy analysis rubric

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<tr>
<th>Policy</th>
<th>Coding descriptions</th>
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<tr>
<td>Part-time public school enrollment</td>
<td>State-level precedent preventing part-time public school attendance (0 points)</td>
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<tr>
<td></td>
<td>Part-time public school attendance policy set by individual districts (1 point)</td>
</tr>
<tr>
<td></td>
<td>Part-time public school attendance access required at state level (2 points)</td>
</tr>
<tr>
<td>State homeschool regulation</td>
<td>High homeschooling regulation (1 point): state requires parents to send notification</td>
</tr>
<tr>
<td></td>
<td>or achievement test scores and/or professional evaluation, plus other requirements</td>
</tr>
<tr>
<td></td>
<td>(e.g., curriculum approval by the state, teacher qualification of parents, or home</td>
</tr>
<tr>
<td></td>
<td>visits by state officials)</td>
</tr>
<tr>
<td></td>
<td>Moderate homeschooling regulation (2 points): state requires parents to send</td>
</tr>
<tr>
<td></td>
<td>notification, test scores, and/or professional evaluation of student progress</td>
</tr>
<tr>
<td></td>
<td>Low homeschooling regulation (3 points): state requires parental notification only</td>
</tr>
<tr>
<td></td>
<td>No homeschooling regulation (4 points): no requirement parents to initiate any</td>
</tr>
<tr>
<td></td>
<td>contact</td>
</tr>
<tr>
<td>State FFA constitution membership language</td>
<td>Members must be enrolled in Agricultural Education course and SAE (1 point)</td>
</tr>
<tr>
<td></td>
<td>Members must be enrolled in Agricultural Education course or SAE (2 points)</td>
</tr>
<tr>
<td></td>
<td>Private school FFA chapters allowed (1 point)</td>
</tr>
<tr>
<td></td>
<td>Homeschool chapters allowed (1 point)</td>
</tr>
</tbody>
</table>

Part-time public school enrollment policies were assigned values based upon their restriction or lack thereof on access to part-time public school enrollment for homeschool students. The assigning of numerical point values based on a policy analysis was to create an easily referenced access index for the purposes of this study. Current policy mandating access statewide to part-time public school enrollment was assigned a numerical value of 2 (highest possible access) on the policy assessment rubric. Current policy that allows individual school districts to determine access to part-time public school enrollment was assigned a numerical value of 1 (may or may not be able to access) on the policy assessment rubric. Current policy prohibiting part-time public school enrollment statewide was assigned a numerical value of 0 (not able to access) on the policy assessment rubric.

Homeschooling regulation policies were assigned numerical values based upon their perceived restriction on parental decision making. No current homeschooling regulation was assigned a numerical value of 4 (unlimited homeschool program flexibility) on the policy assessment rubric. Current policy requiring only parental notification of educational authorities was assigned a numerical value of 3 (high homeschool program flexibility) on the policy assessment rubric. Current policy requiring parental notification of educational authorities plus another requirement such as test score reporting or professional progress evaluations was assigned a numerical value of 2 (moderate homeschool program flexibility) on the policy assessment rubric.
Policy requiring parental notification, professional evaluation, test scores, plus additional regulations such as curriculum approval by the state was assigned a numerical value of 1 (low homeschool program flexibility) on the policy assessment rubric.

State FFA constitution membership policies were assigned numerical values based upon the potential interpretations of membership requirement language and potential impact on FFA membership eligibility. Membership language identical to the National FFA Constitution (be enrolled in at least one agricultural education course during the school year and/or follow a planned course of study; either course must include a supervised agricultural experience program) was assigned a numerical value of 2 (higher flexibility of membership requirement interpretation) on the policy assessment rubric. Membership language requiring enrollment in an agricultural education course without the “or follow a planned course of study” clause was assigned a numerical value of 1 (lower flexibility of membership requirement interpretation) on the policy assessment rubric. Unique membership clauses were dealt with on an individual basis through reflexive dialogue that determined their perceived potential impact on FFA membership accessibility. Any clause explicitly allowing private school FFA members and chapters was given a numerical value of 1 (allows for greater flexibility of membership requirement interpretation). Any clause explicitly allowing homeschool FFA members and chapters was also given a numerical value of 1 (allows for greater flexibility of membership requirement interpretation).

Phase three was a document analysis going back through all policy data (legislative documents, legal precedent documents, and state FFA constitutions) on a state-by-state basis and analyzing and interpreting the potential impact current policies could have on homeschool student Agricultural Education program and FFA membership access. During this phase a raw score for each state was calculated indicating potential Agricultural Education program and FFA membership access for homeschool students. Scores were calculated by combining the rubric scores for each of the three policies. Rubric scores for each policy were equally weighted in the overall potential access score calculation and were used as a starting point for determining the potential homeschool student Agricultural Education program and FFA membership access. There were three states (MD, OK, & TX) where special circumstances required a re-evaluation and re-ranking of potential access level based upon existing scenarios of potential homeschool student Agricultural Education program and FFA membership access and not based entirely on raw policy rubric scores.

Reflexivity of the researcher resulted in potential biases in policy interpretations being monitored throughout the study. Upon completion of the evaluative data analysis and interpretation process, differences in state policies resulted in multiple potential models of Agricultural Education program and FFA membership access. Credibility, dependability, and confirmability were established using iterative questioning, negative case analysis, frequent debriefing sessions, peer scrutiny of the research project, direct quotes from documents, detailed and transparent operational field notes, triangulation, admission of researcher’s beliefs and assumptions, recognition of limitations, audit trail, and reflexive journaling (Shenton, 2004).

Results

Part-time Public School Enrollment Policy

Analysis of state part-time public school enrollment policy resulted in three categories being defined. First, there were four states (HI, MD, NY, OK) that currently prohibit students from enrolling in a public school on a part-time basis. This policy was identified as being the most limiting to potential Agricultural Education program and FFA membership access models for
homeschool students. Second, there were 14 states (AK, ID, IL, IA, ME, MA, MI, NE, NV, NH, UT, VT, WA, WI) that currently require that all schools provide access to students that wish to enroll in a public school on a part-time basis. This policy was identified as being the least limiting to potential Agricultural Education program and FFA membership access models for homeschool students. There were 32 states (AL, AZ, AR, CA, CO, CT, DE, FL, GA, IN, KS, KY, LA, MN, MS, MO, MT, NJ, NM, NC, ND, OH, OR, PA, RI, SC, SD, TN, TX, VA, WV, WY) that have a policy that falls between being the most limiting and the least limiting to potential Agricultural Education program and FFA membership access models for homeschool students. These states do not determine access to part-time public school enrollment at the state legislative level, but rather give the power for that decision to individual school districts.

**Homeschooling Regulation Policy**

Four regulatory policy categories emerged from analyzing state homeschooling regulations. Categories were informed by but not identical to HSLDA defined state regulation criteria (None, Low, Moderate, High). State homeschooling regulations were determined by querying the HSLDA maintained database of current homeschool law and confirmed by consulting cited legislative or legal documentation in the public record. Ten states (AK, CT, ID, IL, IN, MI, MO, NJ, OK, TX) do not require homeschool families provide any notification to local or state education authorities of their intent to homeschool. Iowa is a unique case being that there are different designations for homeschool families resulting in different accessibility to resources based upon the homeschooling designation chosen by the parent. If the “independent private instruction” homeschooling designation is chosen, there are no notification, parent qualification, instruction time, bookkeeping, or assessment requirements. This would put Iowa in this first defined category of homeschooling regulation states, but homeschoolers that choose the “independent private instruction” designation forfeit their eligibility to enroll part-time in public schools. If the “competent private instruction” designation is chosen, annual notice is required as well as the supervision of a certified teacher who will record and monitor academic progress. While being more regulated, selecting the designation of “competent private instruction” results in the homeschooled student being eligible to enroll part-time in public schools, which is currently utilized in multiple states as a model of Agricultural Education program and FFA membership access for homeschool students (e.g., Brown, 2015; Johnson, 2012; Kittle, 2011; Weik, 2015).

Fifteen states (AL, AZ, AR, CA, DE, KS, KY, MS, MT, NE, NV, NM, UT, WI, WY) have a low level of homeschooling regulation, only requiring that parents notify education authorities of their intent to homeschool. The education authority required to be notified varies by state and could be either the local school district or the state department of education.

Twenty states (CO, FL, GA, HI, IA, LA, ME, MD, MN, NH, NC, ND, OH, OR, SC, SD, TN, VA, WA, WV) have a moderate level of homeschooling regulation. States in this category have a wide variety of required paperwork including notification, test scores, and/or student progress reports. States may or may not have intervention procedures in place for homeschooled students making unsatisfactory progress and may offer exceptions to assessments for special needs or other considerations. As described, Iowa is a unique case, but is included in the moderate homeschooling regulation policy category due to part-time public school enrollment eligibility requiring a homeschooling designation with more regulations.

Five states (MA, NY, PA, RI, VT) have a high level of homeschooling regulation. States in this category have thorough assessment requirements for homeschool students in addition to notification and monitoring of student progress.
State FFA Constitution Membership Policy

Analyzing state FFA constitution membership policy resulted in two distinct categories of potential FFA membership access for homeschool students based specifically on membership requirement language, as well as two clauses that explicitly expand potential FFA membership access to non-traditional FFA audiences. The first type of FFA membership requirement language states that the member must be enrolled in at least one approved Agricultural Education course each year and maintain a supervised agricultural experience. This wording was identified as being the least potentially inclusive. Ten states (HI, IN, KY, MO, NV, SC, SD, UT, VT, WA) have this or a similar wording of membership language in their state FFA constitution.

The second type of membership requirement language states that the member must be enrolled in at least one Agricultural Education course each year and/or follow a planned course of study with either including a supervised agricultural experience. This wording was determined to be more inclusive due to the “planned course of study” phrase, which gives more leniency to local FFA advisors allowing them to determine the course of study that qualifies potential FFA members. Thirty-nine states (AL, AK, AZ, AR, CA, CO, DE, FL, GA, ID, IL, IA, KS, LA, ME, MD, MA, MI, MN, MS, MT, NE, NH, NJ, NM, NY, NC, ND, OH, OK, OR, PA, RI, TN, TX, VA, WV, WI, WY) have this or a similar wording of membership language in their state FFA constitution.

The first membership clause for non-public school students observed in state FFA constitutions allows private schools to form FFA chapters and gives potential FFA membership access to private school students. Five states (AL, AK, NC, OR, TX) either explicitly state in their state FFA constitution that private school chapters are allowed, or have a means of providing membership access to private school students. Alabama allows FFA chapters in private schools if the teacher is a state certified Agricultural Education teacher. Alaska includes secondary agricultural and natural resource programs at both charter and private schools as qualifying students for FFA membership. North Carolina does not explicitly mention private school chapters in its state FFA constitution, but there are clearly stated requirements that allow private school chapters to be chartered (Forrest, 2001). Oregon allows private schools to charter FFA chapters if they meet and maintain program approval with state officials and renew that status every three years. Texas explicitly mentions charter and private school students as potential members in its state FFA constitution.

The second membership clause for non-public school students provides homeschool students with potential FFA membership eligibility. Three states (AK, LA, NC) explicitly mention homeschool students in their state FFA constitution. Alaska allows homeschool FFA chapters to be formed and there exists one such chapter in the state with multiple sub-chapters (Massey, 2015). Louisiana added a clause to their state FFA constitution in 2011 that mentions homeschool students, stated to be an attempt to increase enrollment. What is mentioned in the clause is a year-long partnership between the homeschool parent and the Agricultural Education teacher, and does not currently provide the opportunity to form homeschool FFA chapters. North Carolina has the most robust program to provide program access to homeschool students, allowing for the charter of homeschool FFA chapters, but does not include a clause defining membership requirements for homeschool students in their state FFA constitution. Rather, North Carolina maintains this information on their state FFA website.
Potential Homeschool Student Agricultural Education Program and FFA Membership Access

Based upon the numerical values assigned during analyses of three current policies using the developed rubric, each state was assigned a composite score that resulted in a determination of their potential homeschool student Agricultural Education program and FFA membership access (see Table 2). The potential access level value is theoretical and it is important to note that this is based upon current policy only and other factors may also influence what models of Agricultural Education program and FFA membership access are available to homeschool students. Although two states (AK and NC) do have explicit provisions for homeschool student Agricultural Education program and FFA membership access (e.g., Massey, 2015), whether or not homeschool students have access by a similar or a completely different model differs depending on the state. Homeschoolers interested in Agricultural Education are often dealt with on a case-by-case basis as seen in evidence of homeschool student participation in states without explicitly defined models for Agricultural Education program and FFA membership access (e.g., Johnson, 2012).

Five states (AK, ID, IL, MI, NC) currently have high potential access (8 points or above using policy rubric) to Agricultural Education programs and FFA membership for homeschool students. These states have very favorable policies in place that should provide homeschool students access to Agricultural Education program participation and FFA membership eligibility. Alaska and North Carolina have homeschool FFA chapters that provide an obvious pathway for FFA membership. Idaho, Illinois, and Michigan currently have state-level policy in place that grants part-time public school enrollment access to homeschool students, thus allowing for the most commonly observed Agricultural Education program participation and FFA membership eligibility model outside of states that have an explicit separate model for homeschool students. Alaska, Idaho, Illinois, and Michigan also do not have regulations regarding homeschooling, thus allowing parents to potentially incorporate an Agricultural Education course into their students' plan of study without consulting with local or state officials to ensure the course would count towards subjects required by current policy, as would potentially be the case were they in a state with a higher level of homeschooling regulation.

Twenty-three states (AL, AZ, AR, CA, CT, DE, IN, IA, KS, LA, ME, MS, MO, MT, NE, NV, NH, NJ, NM, TX, UT, WI, WY) have moderate potential access (6 or 7 points using policy rubric) to Agricultural Education programs and FFA membership for homeschool students. These states have favorable policies in place, but should consult policy to determine a locally informed access model for homeschool student Agricultural Education program participation and FFA membership eligibility. Local determination is required due to current state policy that determines part-time public school enrollment access at either the district level (in AL, AZ, AR, CA, CT, DE, KS, LA, ME, MS, MO, MT, NJ, NM, TX, WY) or the local level (in IN). Other states in this category (IA, NE, NH, NV, UT, WI) have policy in place that requires access for homeschool students to part-time public school enrollment, but have a higher level of homeschooling regulation. With a higher level of homeschooling regulation in place, there could be required subjects that limit the flexibility of homeschool parents desiring to incorporate Agricultural Education into their curriculum.

Eighteen states (CO, FL, GA, KY, MA, MN, ND, OH, OR, PA, RI, SC, SD, TN, VT, VA, WA, WV) have low potential access (4 or 5 points using policy rubric) to Agricultural Education programs and FFA membership for homeschool students. These states will need to consult policy to determine an access model for homeschool student Agricultural Education program participation and FFA membership eligibility and may require policy changes. Fifteen states in the “low potential access” category (CO, FL, GA, MN, ND, OH, OR, PA, RI, SC, SD, TN, VT, VA, WV) have policy
in place that determines part-time public school enrollment access at the district level coupled with a higher level of homeschooling regulation. Two states in the “low potential access” category (MA, WA) have policy in place that requires access for homeschool students to part-time public school enrollment, but have an even higher level of homeschooling regulation than states in the “moderate access” category. One state in the “low potential access” category (KY) determines part-time public school enrollment access for homeschool students at the district level and has a low level of homeschooling regulation, but has a unique and ambiguous membership clause in its state FFA constitution, therefore potentially restricting FFA membership eligibility.

Four states (HI, MD, NY, OK) have no potential access (3 or fewer points using policy rubric) to Agricultural Education programs and FFA membership for homeschool students and will need to change policy to provide access opportunities. All four states prohibit part-time public school enrollment statewide therefore preventing access to the most commonly observed model of Agricultural Education program participation and FFA membership eligibility for homeschool students. Additionally, none of the four states have explicit provisions in their state FFA constitution membership clauses allowing for either private or home school FFA members or chapters. Three of the four states (HI, MD, NY) also have a moderate or high level of homeschooling regulation and as mentioned earlier, with a higher level of homeschooling regulation in place, there could be required subjects that limit the flexibility of homeschool parents wanting to incorporate Agricultural Education into their curriculum.
Table 2

State Policy Analysis and Potential Homeschool Student Agricultural Education Program and FFA Membership Eligibility Access

<table>
<thead>
<tr>
<th>State</th>
<th>Part-time Public School Enrollment</th>
<th>Homeschooling Regulation</th>
<th>State FFA Membership Clause</th>
<th>Current Potential Access Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>District determined</td>
<td>Low</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Alaska</td>
<td>State required</td>
<td>None</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>High</td>
</tr>
<tr>
<td>Arizona</td>
<td>District determined</td>
<td>Low</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Arkansas</td>
<td>District determined</td>
<td>Low</td>
<td>Enrolled and/or SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>California</td>
<td>District determined</td>
<td>Low</td>
<td>Regularly enrolled</td>
<td>Moderate</td>
</tr>
<tr>
<td>Colorado</td>
<td>District determined</td>
<td>Moderate</td>
<td>Regularly enrolled and majority vote</td>
<td>Low</td>
</tr>
<tr>
<td>Connecticut</td>
<td>District determined</td>
<td>None</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Delaware</td>
<td>District determined</td>
<td>Low</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Florida</td>
<td>District determined</td>
<td>Moderate</td>
<td>Enrolled</td>
<td>Low</td>
</tr>
<tr>
<td>Georgia</td>
<td>District determined</td>
<td>Moderate</td>
<td>Enrolled</td>
<td>Low</td>
</tr>
<tr>
<td>Hawaii</td>
<td>State prohibited</td>
<td>Moderate</td>
<td>Enrolled or SAE</td>
<td>None</td>
</tr>
<tr>
<td>Idaho</td>
<td>State required</td>
<td>None</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>High</td>
</tr>
<tr>
<td>Illinois</td>
<td>State required</td>
<td>None</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>High</td>
</tr>
<tr>
<td>Indiana</td>
<td>School determined</td>
<td>None</td>
<td>Enrolled and SAE</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
Table 2 (continued)

State Policy Analysis and Potential Homeschool Student Agricultural Education Program and FFA Membership Eligibility Access

<table>
<thead>
<tr>
<th>State</th>
<th>Part-time Public School Enrollment</th>
<th>Homeschooling Regulation</th>
<th>State FFA Membership Clause</th>
<th>Current Potential Access Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>State required (depends on homeschool setup)</td>
<td>Moderate</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Kansas</td>
<td>District determined</td>
<td>Low</td>
<td>Enrolled or SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Kentucky</td>
<td>District determined</td>
<td>Low</td>
<td>Enrolled and attend</td>
<td>Low</td>
</tr>
<tr>
<td>Louisiana</td>
<td>District determined</td>
<td>Moderate</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Maine</td>
<td>District determined (&quot;unreasonable&quot; denial prohibited by state)</td>
<td>Moderate</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Maryland</td>
<td>State prohibited</td>
<td>Moderate</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>None</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>State required</td>
<td>High</td>
<td>Enrolled and/or SAE</td>
<td>Low</td>
</tr>
<tr>
<td>Michigan</td>
<td>State required</td>
<td>None</td>
<td>Enrolled or SAE</td>
<td>High</td>
</tr>
<tr>
<td>Minnesota</td>
<td>District determined</td>
<td>High</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Low</td>
</tr>
<tr>
<td>Mississippi</td>
<td>District determined</td>
<td>Low</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Missouri</td>
<td>District determined</td>
<td>None</td>
<td>Enrolled and SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Montana</td>
<td>District determined</td>
<td>Low</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
Table 2 (continued)

<table>
<thead>
<tr>
<th>State</th>
<th>Part-time Public School Enrollment</th>
<th>Homeschooling Regulation</th>
<th>State FFA Membership Clause</th>
<th>Current Potential Access Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nebraska</td>
<td>State required</td>
<td>Low</td>
<td>Enrolled and/or SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Nevada</td>
<td>State required</td>
<td>Low</td>
<td>Enrolled and SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>State required</td>
<td>Moderate</td>
<td>Enrolled and SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>New Jersey</td>
<td>District determined</td>
<td>None</td>
<td>Enrolled and/or SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>New Mexico</td>
<td>District determined</td>
<td>Low</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>New York</td>
<td>State prohibited</td>
<td>High</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>None</td>
</tr>
<tr>
<td>North Carolina</td>
<td>District determined</td>
<td>Moderate</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>High</td>
</tr>
<tr>
<td>North Dakota</td>
<td>District determined</td>
<td>Moderate</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Low</td>
</tr>
<tr>
<td>Ohio</td>
<td>District determined</td>
<td>Moderate</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Low</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>State prohibited</td>
<td>None</td>
<td>Under age 23 and enrolled on the program</td>
<td>None</td>
</tr>
<tr>
<td>Oregon</td>
<td>District determined</td>
<td>Moderate</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Low</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>District determined</td>
<td>Moderate</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Low</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>District determined</td>
<td>High</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Low</td>
</tr>
</tbody>
</table>
Table 2 (continued)

State Policy Analysis and Potential Homeschool Student Agricultural Education Program and FFA Membership Eligibility Access

<table>
<thead>
<tr>
<th>State</th>
<th>Part-time Public School Enrollment</th>
<th>Homeschooling Regulation</th>
<th>State FFA Membership Clause</th>
<th>Current Potential Access Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Carolina</td>
<td>District determined</td>
<td>Low</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Low</td>
</tr>
<tr>
<td>South Dakota</td>
<td>District determined</td>
<td>Moderate</td>
<td>Enrolled or SAE and majority vote</td>
<td>Low</td>
</tr>
<tr>
<td>Tennessee</td>
<td>District determined</td>
<td>Moderate</td>
<td>Enrolled and majority vote</td>
<td>Low</td>
</tr>
<tr>
<td>Texas</td>
<td>District determined</td>
<td>None</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Utah</td>
<td>State required</td>
<td>Low</td>
<td>Enrolled and SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Vermont</td>
<td>State required</td>
<td>Moderate</td>
<td>Enrolled</td>
<td>Low</td>
</tr>
<tr>
<td>Virginia</td>
<td>District determined</td>
<td>Moderate</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Low</td>
</tr>
<tr>
<td>Washington</td>
<td>State required</td>
<td>Moderate</td>
<td>Enrolled and SAE</td>
<td>Low</td>
</tr>
<tr>
<td>West Virginia</td>
<td>District determined</td>
<td>Moderate</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Low</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>State required</td>
<td>Low</td>
<td>Enrolled and/or SAE</td>
<td>Moderate</td>
</tr>
<tr>
<td>Wyoming</td>
<td>District determined</td>
<td>Low</td>
<td>Enrolled and/or planned course of study, SAE</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
Implications

Homeschool student Agricultural Education program participation and FFA membership eligibility models are complicated and not universal. Models available to homeschool students in each state are determined by current policy and can vary from enrolling in a local public school part-time, to completing an online Agricultural Education course, or even completing an SAE as an approved course, all potentially resulting in FFA membership eligibility, given that state’s FFA constitutional language and policy landscape.

FFA Membership Language

An implication from this policy analysis is that there may be ambiguity regarding what activities are required to qualify a student for FFA membership and how inclusive membership language is in state FFA constitutions. Subtle variations of wording occur among the first grouping of state FFA constitutions (least potentially inclusive language) including in Indiana, where the FFA “member must be enrolled in at least one approved course each year and maintain a supervised agricultural experience.” The level that course approval must come from is not defined. Kentucky also has a subtle difference that states the FFA “member must be enrolled in at least one agricultural education class each year and attend that class when it is taught.” The Indiana FFA membership language could be interpreted that the supervised agricultural experience is the approved course that qualifies a student for FFA membership, thus not requiring the student to physically attend a course in the FFA chapter’s home school. In contrast, the Kentucky FFA membership language appears to explicitly state that the qualifying course must be attended, thereby requiring the student to be physically in the public school of the FFA chapter.

Ambiguity also appears in the second grouping of state FFA constitutions (most potentially inclusive language) including in Tennessee, where “any student regularly enrolled in agriculture education is entitled to become an active member upon receiving a majority vote of the members present at any chapter meeting.” The Tennessee FFA membership language could be interpreted such that a student could join any FFA chapter, so long as they meet the enrollment requirement at some school and are voted into membership status by the current FFA members in that chapter. Wisconsin has a different wording that states the FFA “member must be enrolled in at least one Agriculture Education course during the school year and/or follow a planned course of study for an agricultural occupation (including a supervised agricultural experience program).” The Wisconsin FFA membership language more explicitly states the implied membership pathway from the Indiana FFA membership language, that a supervised agricultural experience could count as an approved course of study qualifying the student for FFA chapter membership.

Increasing potential FFA membership access and membership moving forward should warrant a reexamination of current FFA membership language in state FFA constitutions. Clarity in interpreting FFA membership clauses would help potential FFA members and local Agricultural Education teachers acting as FFA advisors have a clearer understanding of various pathways to meet active FFA membership requirements. If specific curricular requirements can be met under current policy and are met, FFA membership access should be provided. However, another implication of this policy analysis is that many current FFA members may not be meeting all requirements of being an agriculture student. Previous research shows that supervised agricultural experiences (SAE) are an underutilized component of the three-circle model of Agricultural Education (Lewis et al., 2012; Talbert & Balschweid, 2004), yet there are many states that have completion of an SAE as a requirement for FFA membership eligibility. State FFA constitutions and their language are the public face for FFA program access, and upon analyzing the membership clauses there appears to be a need for reform. The first step in empowering local Agricultural
Education teachers acting as FFA chapter advisors to grow their programs and expand access is to provide them with easily interpretable inclusive FFA membership language.

Program Participation Models

Multiple potential models of Agricultural Education program participation and FFA membership eligibility for homeschool students exist, with some models currently being implemented. The fundamental philosophy of the three-circle Agricultural Education model remains an underlying tenet of all the models. That is, all the observed or potential models exhibit a “classroom instruction” component, an SAE component, and an FFA component. State leaders in Agricultural Education and FFA wishing to increase their outreach to the homeschooling community can consult the following potential options for models keeping in mind that the current policy landscape within their state determines which models are even a possibility.

The first of the three circles in the Agricultural Education model that would need to be addressed with regards to the potential of homeschool student program participation is classroom instruction. There are multiple possibilities for homeschool students to complete classroom instruction, some of which are currently implemented, while others could be implemented if they are deemed acceptable.

In states where part-time public school enrollment is possible, homeschool students attending courses in the Agricultural Education classroom at the local public school is the simple model of program participation and FFA membership eligibility. However, in states where the authority to determine part-time public school enrollment access lies with individual school districts, a patchwork of districts with and without this access could be confusing to both local Agricultural Education teachers and homeschool parents. Future work exists in exploring this possibility, which includes contacting districts statewide to determine their current local policy regarding part-time enrollment access. Additionally, for districts that allow part-time enrollment, it should be ascertained whether they allow homeschool students that reside in other school districts to enroll part-time in public schools within their district. An understandable objection to this type of policy is the possibility of one school or district “stacking the deck” for their FFA career development event (CDE) teams. Taking this idea to its logical conclusion would result in a consolidation of talented students on to one team by having students from a wider geographical area all become eligible for membership in one FFA chapter by having those students claim they are being “homeschooled” without any actual intention of doing so. While this is a logical concern, the potential benefits of allowing access to legitimately homeschooled students in districts where part-time public school enrollment is allowed while adjacent districts do not allow part-time enrollment would have to be weighed to discern if there are any questionable practices taking place, although actual questionable practices such as the described scenario should be rare. Any “stacking” of CDE teams whether through this potential loophole or any other questionable practices goes against the fundamental philosophies of Agricultural Education and FFA and not considered representative of what would happen should legitimately interested homeschool students be provided with a model of Agricultural Education program participation and FFA membership eligibility.

Another potential model of Agricultural Education program participation for homeschool students regarding classroom instruction is online instruction. Online Agricultural Education courses do exist (Shipman, 2016a), but policy questions would need to be addressed for this to be an option for homeschool students that would result in FFA membership eligibility (Shipman, 2016b). Online courses are produced and hosted in one state following current educational policy by a teacher certified in that state, but if the course is completed by a student in a state that does
not have reciprocal teaching certification with the state of origin for the course, a question would be if the instruction still counted as being taught by a certified Agricultural Education teacher.

A third potential program model of classroom instruction for homeschool students exists—an Agricultural Education curriculum taught by the homeschool parent. This is currently available in North Carolina and Alaska which have an explicitly defined model of Agricultural Education program participation and FFA membership eligibility for homeschool students, but is not a widespread phenomenon. States looking to pursue this avenue of classroom instruction would have to determine if a singular approved curriculum is the only option for a homeschool parent, or if any curriculum regarding agriculture broadly defined would be acceptable.

The second of the three circles in the Agricultural Education model that would need to be addressed with regards to the potential of homeschool student Agricultural Education program participation is the SAE component. Once again, multiple possibilities exist, some which are utilized and others that could be implemented if they are deemed acceptable.

The first potential model for homeschool students wanting to complete an SAE in order to have a complete Agricultural Education experience is for the local Agricultural Education teacher to directly oversee the SAE. If the homeschool student is enrolled part-time at the teacher’s school and a member of the school’s FFA chapter, this is a logical model for SAE completion.

However, another possibility is that the “classroom instruction” component is not taking place at the local public school, either occurring online or being taught by the homeschool parent. In this scenario, a possible model would be a collaboration between the local Agricultural Education teacher and the homeschool parent in order to ensure the SAE adheres to standards. In either scenario, it is possible that the SAE could make the homeschool student eligible for FFA membership by being classified as a “course of study” depending on the membership language in the state FFA constitution.

The final circle in the agricultural education model that would need to be addressed with regards to the potential of homeschool student Agricultural Education program participation is FFA membership. One model seen in Alaska and North Carolina and mentioned earlier explicitly defines separate homeschool FFA chapters for homeschool students existing alongside traditional FFA chapters. Homeschool student FFA chapters make the most sense and are observed in a scenario such as North Carolina where the students are not completing their “classroom instruction” component through part-time public school enrollment. As mentioned previously, if the homeschool student is enrolled part-time at a public school, then a commonly observed model is homeschool student participation in the local school FFA chapter. Additional possible participation models exist too, including homeschool students competing independently without chapter affiliation, and virtual online FFA chapters.

Although policy analyses revealed part of the picture regarding accessibility of models for homeschool student participation in Agricultural Education and FFA, further research is needed to more clearly determine the accessibility and feasibility of models in each state. Future work exploring the acceptability of different Agricultural Education program participation and FFA membership eligibility models by eliciting opinions from state- and local-level Agricultural Education and FFA leaders is underway, and aims to add further context to the data garnered from this study.
References


Student Perceptions of Accelerated Course Delivery Format for Teacher Preparation Coursework

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Abstract

Acceleration of courses has been documented to achieve an extended academic calendar, financial benefits to universities, time savings for professors, and provide more flexibility for students. The purpose of this study was to examine preservice teachers’ learning experiences while enrolled in two accelerated teacher preparation courses. Results showed that students were dissatisfied with the accelerated course format and reported feeling stressed. Students noted challenges to meeting course expectations, but also indicated perceive benefits such as time management and realistic expectations for teachers. Additionally, students perceived they mastered the concepts from both courses. Although students did not prefer the accelerated course structure, the courses helped students gain the expected knowledge and skills. Based on conclusions of this study, recommendations include: (a) courses be reformatted back to the traditional semester delivery, (b) the curriculum design course be moved to the semester prior to the teaching methods course, and (c) universities should carefully review their entire teacher education curricula before adopting an accelerated class format.

Keywords: accelerated learning; curriculum design; preservice teachers; program evaluation; teacher education; teaching methods

Introduction and Literature Review

Teacher education in agriculture aims to prepare the next generation of agriculture teachers working in public schools throughout the country (Wardlow & Osborne, 2010). The goal of teacher
education in agriculture has been described as “to prepare teachers who are competent in a variety of agricultural subject matter areas and who are effective in the methods and techniques of curriculum planning, instruction, and student and program evaluation” (Barrick & Garton, 2010, p. 32). To meet this goal, teacher education programs have required students to complete coursework in instructional design, teaching methods, and program planning.

In a review of selected agricultural teacher education programs in the United States, McLean and Camp (2000) discerned that variety existed in teacher education coursework offered, but the most commonly reported course was related to methods of teaching. Due to variation in courses offered, McLean and Camp (2000) categorized coursework into five areas including: (a) experiential components, (b) foundations, (c) program and curriculum planning, (d) teaching methods, and (e) teaching technology. The variety of curricular structure across institutions indicated that program offerings and design were created to align with the needs of students.

Phipps, Osborne, Dyer, and Ball (2008) asserted that agriculture education programs should seek to align with the needs of the local community. Similarly, agriculture teacher education programs may need to adapt program design and offerings according to needs of the institution and student population. As a means of increasing the strength of program design, Darling-Hammond and Bransford (2005) posited that strong teacher education programs address three major types of learning experiences to help preservice teachers gain experience developing curricula, including alignment with standards; instructional design process; and review and evaluation of curricula and lesson plans. Development of curricula often begins with the end outcomes in mind, while outlining the ideal means of achieving these end results (Wiggins & McTighe, 2005). Planning ahead can ensure connection and coherence across the teacher education program and that the program is employing the best design and delivery practices while supporting student learning (Darling-Hammond & Bransford, 2005).

Instructional delivery should be designed to best meet the needs of learners. The primary goal of adjusting or modifying delivery of instruction should be to seek out strategies to improve student learning performance (Ho & Polonsky, 2009). Not only is it important to enhance student learning outcomes, but it is essential to increase the marketability of programs in higher education (Hyun, Kretovics, & Crowe, 2006). Further research is needed regarding the most effective teacher preparation program design and delivery. Lynch (1996) suggested that major changes were necessary in the way teachers are prepared in career and technical education, and later Myers and Dyer (2004) asserted that further study of coursework configuration was required to identify experiences that best prepare future teachers. Knipe (2016) found that greater flexibility in the design of teacher preparation programs was needed to produce teachers who could work in a broad range of situations based on the rapidly changing needs of modern education. Such flexibly designed programs might be what Windschitl (2005) suggested when he emphasized that teacher education research should not be about which singular program model is most effective, but which models work best in given situations.

Teacher preparation programs have debated whether curriculum design and teaching methods courses should co-exist in the same semester or if one course should be taught prior to the other. Following the Understanding by Design (UbD) model (Wiggins & McTighe, 2005), students must know how to design curriculum based upon global outcomes in order to build curriculum with the end result being the creation of daily objectives and teaching strategies. Therefore, teacher preparation programs should teach students how to design curriculum first, followed by informing students on teaching methods. The strategy to best organize course offerings has become a focal point for preservice teacher preparation programs that have numerous transfer students who take three semesters on-campus prior to their student teaching internship. Nonetheless, following the
framework of UbD, there is a call for curriculum design to be taught prior to teaching methods. One adjustment to teaching courses on curriculum design and teaching methods is to allow for the completion of the two courses during one semester without overlap at an accelerated pace.

Wlodkowski (2003) defined accelerated courses as being delivered in fewer contact hours over a shorter amount of time compared to traditionally delivered courses, which typically meet face-to-face between ten and fifteen times over the course of a quarter or semester (Daniel, 2000). Accelerated courses have also been described as block mode, compressed course, and flexible mode (Ho & Polonsky, 2009), time-shortened courses (Daniel, 2000), and abbreviated courses (Anastasi, 2007). Although originally designed to allow institutions to offer coursework within a restricted time frame (Ho & Polonsky, 2009), accelerated learning formats have been more recently offered to meet the needs of adult learners requiring flexible scheduling (Boyd, 2004; Collins, Hay, & Heiner, 2013; Daniel, 2000; Davies, 2006), as well as to meet the demands of budgeting concerns (Davies, 2006). Nontraditional students, typically defined as college students older than 24 years of age (Johnson et al., 2016), may also benefit from accelerated coursework, as they often have career, financial, and family responsibilities. Accelerated courses are often offered during summer sessions and can be useful for nontraditional students (Daniel, 2000). Utilizing accelerated coursework for teacher preparation programs can meet the needs of nontraditional students while allowing them to achieve their degree in a timely manner.

Traditional course delivery might not be best at meeting the needs of all students in higher education (Collins et al., 2013), including agricultural education programs. Thus, accelerated learning formats have become increasingly popular throughout the United States and around the world (Wlodkowski, 2003), but have been the subject of much criticism. Teaching faculty and administrators often hold the belief that accelerated courses are not as effective as traditional courses (Daniel, 2000; Scott, 2003), forsaking academic rigor for convenience.

Scott (2003) identified four major characteristics of high quality learning experiences within the context of an accelerated course: (1) instructor characteristics, (2) teaching methods, (3) classroom environment, and (4) evaluation methods. These characteristics were identified to have had strong influence over the experiences that students perceived when enrolled in accelerated courses. When these characteristics were present and positive, students were more likely to prefer accelerated coursework over traditional length courses, but when absent or negative, students described the accelerated course as becoming tedious and unpleasant. Characteristics that students desired from their instructors included displaying enthusiasm for the subject, incorporating student feedback regarding the course, and demonstrating care concerning student learning. Perceived effective teaching methods included using active learning methods, emphasizing depth versus breadth of material taught, incorporating small and large group discussion, and utilizing experiential and applied learning methods. In terms of the ideal classroom environment, students asserted they wanted close, trusting relationships with their peers and instructors, which would lead to increased participation. They also stressed that despite the intensity of the course, they preferred a relaxed, supportive, and nonjudgmental classroom environment. Finally, students stated that the structure of the course and types of assignments should be modified to be more easily completed in the shorter time frame, while allowing them the opportunity to apply the material in a personal way.

Although there have been suggestions for best practices of designing and delivering accelerated coursework, not much research has been conducted to help faculty understand how to best design curriculum to meet both the pedagogical needs of students and the time constraints of the compressed design. Research has found that faculty may make adjustments to the course according to the accelerated design, but these decisions were not always based on pedagogical
reasons, but rather the need to fit the course into a shorter time frame (Kretovics, Crowe, & Hyun, 2005). Hyun et al. (2006) concluded that faculty teaching accelerated coursework were concerned about the amount of material needed to be taught within a shorter time frame as well as how many courses students were allowed to take at a time. The faculty reported that students enrolled in accelerated courses were more focused, but had less time to internalize the material presented, which negatively impacted some students (Hyun et al., 2006). At the same time, faculty perceived that the nature of the accelerated course time frame might attract students of non-traditional backgrounds. However, Lee and Horsfall (2010) stated that students and faculty reported positive experiences, yet noted that students raised concerns about assessment tasks and workload. Collins et al. (2013) emphasized that faculty teaching accelerated courses need to be provided with professional development and training on how to appropriately prepare them to teach courses in a compressed format, and cited strategies that institutions could take at the department, course, faculty, and university levels.

Given that literature has cited appropriately designed and delivered accelerated coursework as effective, teacher educators at the University of Florida restructured two preservice teacher courses to be delivered in an accelerated structure. The purpose of this study was to explore preservice teachers’ experience while enrolled in these courses.

Conceptual Framework

This study was guided by two primary theories. The design and delivery of the accelerated courses followed principles of the Understanding by Design (UbD) framework (Wiggins & McTighe, 2005). Outcomes were framed using Kirkpatrick’s four levels of program outcomes (Kirkpatrick, 1994).

Using an UbD approach to curriculum development, curriculum writers begin with the end in mind, identifying what students should be able to know, understand, and be able to do at the conclusion of the instructional unit (Wiggins & McTighe, 2005). When establishing the desired results of instruction, designers identify appropriate enduring understandings, or the big ideas of a unit. They also list essential questions, which when posed to students, stimulate inquiry, provoke discussion, and support transfer of learning. Then, the curriculum designer determines what assessments will be used as evidence of students appropriately meeting the desired outcomes of instruction. Finally, as a last step, learning experiences and instruction are planned to be aligned with the end goal outcomes.

In addition to developing the enduring understandings, essential questions, and forms of assessment, it is vital that the educator accounts for the “scope and sequence” of the topics being delivered through the curriculum. Although high quality teaching and assessment might be developed, if they are not delivered in an appropriate order or pacing, effective learning will likely not occur. Wiggins and McTighe (2005) asserted that “sequencing the learning, mindful of performances and big ideas that recur, is as important as the quality of the curricular elements – perhaps more so, if learner engagement, understanding, and productivity are the criteria for judging the sequence” (p. 291).

UbD was used to design the teacher education program. All courses in the teacher education program contributed to the program’s mission statement and student learning objectives were aligned with the state’s educator performance standards. Two courses were redesigned into 8-week long condensed courses using UbD principles. In accordance with delivering instruction in an appropriate sequence (Wiggins & McTighe, 2005), the first course to be delivered was the
Kirkpatrick’s (1959; 1994) four level model has been highly used as an evaluation tool for organizational training (Lin, Chen, & Chaung, 2011; Smidt, Balandin, Sigafoos, & Reed, 2009; Tan & Newman, 2013) and educational programs (O’Neil, Wainess, & Baker, 2006; Praslova, 2010; Rouse, 2011). The four criteria levels included in Kirkpatrick’s model are reaction, learning, behavior, and results. When applied to formal educational settings, the first level of the model, reaction criteria, includes student perceptions of the design and delivery of the educational program. Learning criteria, which is level two, includes measures of student performance, such as knowledge tests or skill demonstrations. The third level, behavioral criteria, refers to students’ transfer of knowledge or skills beyond the context in which the initial learning occurred. The last level, results criteria, when applied to educational programs, describes long-term outcomes such as career success, personal stability, and service to society (Praslova, 2010).

The first two levels of Kirkpatrick’s model were the primary focus areas of the course evaluations because they were measurable within the timeframe of the study. Students’ reactions toward the learning experience, in addition to learning outcomes, are foundational measurements to evaluate educational programs. Students’ reactions and attitudes toward the design and delivery of learning experiences are commonly used for program evaluation (Dysvik & Martinsen, 2008; Jones, 2017) and have been shown to influence learning outcomes (Armbruster, Patel, Johnson, & Weiss, 2009; Eom, Wen, Ashill, 2006).

Purpose and Objectives

The purpose of this study was to examine preservice teachers’ learning experiences while enrolled in two accelerated teacher preparation courses. The objectives were:

1. Describe preservice teachers’ perceptions of an accelerated course structure.
2. Describe preservice teachers’ perceptions of content mastery and confidence while enrolled in two accelerated courses.

Method

A mixed-methods approach was used for this study. Mixed-methods research is useful when one research method cannot fully examine the phenomenon alone (Creswell & Plano-Clark, 2011). This type of research method has become more common in recent years to address complex problems in agricultural education (Epler, Drape, Broyles, & Rudd, 2013; McCubbin, Paulsen, & Anderson, 2016; Walker, 2010; Witt, Doerfert, Ulmer, Burris, & Lan, 2013). Specifically, a convergent mixed-methods design was employed (Creswell & Plano-Clark, 2011). This design collects and analyzes quantitative data and qualitative data separately and independently from one another. The two data strands are not converged until the interpretation of the results (Creswell & Plano-Clark, 2011).

This study was conducted in the fall semester of 2016 at the University of Florida. The population was agricultural education preservice teachers enrolled in both teaching methods and curriculum design. In the past, these courses had been offered simultaneously and lasted the entire semester. The accelerated course design separated the semester in half. During the first eight weeks, preservice teachers were enrolled in the curriculum design course and were taught by an Associate Professor of Agricultural Education. The students were taught by a different Professor of Agricultural Education the second eight weeks in the teaching methods course. Each course met
for six, 45-minute periods each week for a duration of eight weeks. Two of the six periods were
dedicated to lab time. There were 34 students enrolled in both courses \(N = 34\); 15 juniors, 16
seniors, and three master students. Data for this study were collected after the conclusion of the
spring semester at a preservice teacher meeting. Twenty-seven students \(n = 27; 79\%\) participation
rate) attended the meeting and agreed to participate in the study.

Qualitative methods were used to address objective one. Focus groups were utilized
because they allow participants to express ideas and opinions in a social environment, which is
reflective of how attitudes are formed in everyday settings (Morgan, 1998; Perloff, 2013). Students
were asked to participate in one of two focus groups at the end of the spring semester, one for
junior-level students and one for senior-level students. This approach was selected because the
seniors were completing their student teaching internships, and their availability was much more
limited. The juniors were enrolled in a different agricultural education course and were much more
accessible. To help encourage unbiased and honest answers from the students, a researcher not
involved in the delivery of the courses moderated the sessions. A semi-structured moderator’s guide
was utilized, and students were asked about overall satisfaction of the accelerated course
experience, perceptions of the lecture and lab structure, and attitudes toward the accelerated
timeline for assigned coursework.

Upon completion of the focus groups, the moderator recited key themes of the discussion
back to participants and asked the participants if it was an accurate summary or if they would like
to add anything else. This use of member-checking ensured the accuracy and completeness of the
information with the participants to account for credibility (Lincoln & Guba, 1985). Two audio-
recorders were used in each focus group, and the tapes were transcribed to aid in analysis. Glaser’s
(1965) constant comparative method of analysis was used to identify central themes related to
preservice teachers’ perceptions of the accelerated course design.

A subjectivity statement for the coder has been included to help understand any biases or
assumptions that may have influenced the validity of this study (Merriam, 1998). The coder was an
agricultural education doctoral candidate in the program who also served as a teaching assistant for
the courses. The coder had completed a bachelor of science degree in agricultural and extension
education degree at another university, and a master of science degree in agricultural education at
the institution under study. Additionally, the coder worked as a school-based agriculture instructor
in a different state for six years. The coder acknowledged the importance of the two courses and
believed students will need to be able to manage their time and balance a heavy workload as future
agriculture teachers. The coder acknowledged the importance of considering students’ perceptions
of their class experiences along with the content knowledge gained and believed that students with
a more positive experience are more likely to transfer their learning into their future classrooms.

A peer debriefer was used during analysis of the qualitative data to play the role of devil’s
advocate and to help improve the credibility of the findings (Holloway, 1997). The peer debriefer
had served as the moderator from the focus group and had no connection to the courses. An audit
trail of the analysis codes as themes were identified, condensed, and were kept to increase the
dependability of the findings. A detailed description of the students, courses, and instructors were
provided to increase the study’s transferability (Lincoln & Guba, 1985). Pseudonyms were used to
ensure the confidentiality of the students and instructors.

Prior to the focus group sessions, the students were asked to complete a 30-item
questionnaire. The items were designed to assess the preservice teachers’ perceptions of content
mastery and confidence that were reflective of course objectives. A 15-item, 5-point Likert-type
scale was used to measure content mastery and confidence for the instructional design course \(1 =\)
strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree). Similarly, 15-items, using a 5-point Likert-type scale were used to measure content mastery and confidence for the teaching methods course (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree). A panel of experts reviewed the questionnaire prior to distribution to address face and content validity and both scales were reliable with a Cronbach’s alpha greater than .70 (Field, 2013). Descriptive analysis of the data were used to address objective 2.

Data convergence was completed after the conclusion of the study. As per the convergent parallel design, both the qualitative and quantitative strands were analyzed independently (Creswell & Plano-Clark, 2011). The quantitative data provided a general understanding for the students’ confidence and content mastery, while the qualitative data provided a more in-depth understanding of the students’ perceptions of an accelerated course design. The two data sets were integrated and related to one another in the conclusions to provide a holistic understanding of preservice teachers’ learning experiences while enrolled in two accelerated teacher preparation courses.

Results

Objective one sought to describe preservice teachers’ perceptions of an accelerated course structure. Themes which emerged included stress, challenges, and benefits.

Stress

The students in the junior focus group shared a consensus that they experienced “more stress” in this course than other university classes they have taken. The seniors also recognized the stress they experienced in the courses. Shelly (Sr.) stated, “I think it was a lot more stressful on us than it really needed to be. … [It was] a very large stress on my life.” The students attributed a lot of the stress to issues with the time frame in which they learned the material and completed assignments. Their comments focused on the amount of time spent on class, the amount of time spent on assignments, and the turn-around time on assignments.

Students felt the pressure of the condensed course structure. Jen (Sr.) said, “… having them crammed into a six-week time span was a headache.” Additionally, the students thought that the amount of time required of them for the condensed classes was excessive.

That was the consensus of why it was a little frustrating, because we had a lot of class time especially with the condensed eight weeks. We were meeting a lot during the week. We were meeting for four hours for lecture, and then plus we were meeting for two and a half hours for lab, so we were on campus for five and a half to six hours for this class every week, on top of you know, an online portion (Ben, Jr.).

While the juniors focused on the amount of time which was spent on assignments associated with additional elements of the course and observation hours, the seniors honed in on the amount of time which was required to produce daily lesson plans in the amount of detail expected.

I also think that just the amount of content that went into the lesson plans itself, it was more stressful because we all had other classes that we needed to worry about, and the lesson plan took up a majority of my time. And so I wasn’t focusing on any other class, it’s just on that one specific lesson plan (Luke, Sr.).
The seniors compared the lesson plans that they were expected to complete for these courses with the lesson plans they completed during their student teaching.

We are not creating that quality of lesson plans during our teaching experience so we really didn’t have to have that. Yes, we’re having to create lots of lesson plans but I don’t know if I’m just speaking for myself but I don’t think the quality of my lesson plans were anything like the quality of lesson plans we turned in for class (Hannah. M.S.).

Another student mentioned, “In a real-life situation, when you’re in the classroom setting like that, you don’t have time to plan out every single lesson in that much detail” (Casey, Sr.).

Alec (Jr.) underscored how the condensed structure created a pace which was difficult. He said

we met so often, but the eight weeks condensed it so much that it was like get into class and we’re already by the first week we’re two to three weeks ahead just like that, and it was hard to keep pace with that because by the time we got to the second half of methods, it was like first week of lab you already have a presentation to do and we just started the class.

Ally (Sr.) talked about the short turn-around time between learning and application. She said

we had class Monday [and] Wednesday and then we would learn the new content on Monday and those of us who were teaching on Tuesday would have to turn around in less than 24 hours and produce the quality that they wanted in less than 24 hours, while other students had until Thursday or the following week to get it done.

Hannah (M.S.) noted how the short time frames impacted the work quality. “It was all just crammed together. We didn’t really have time to put in quality work for either of the classes.” Additionally, Adam (Sr.) highlighted the difficulties in getting feedback from assignments in time for other assignments. “A lot of our assignments we would finish it and then we would have three or four days before the next one’s due, before we’d ever get feedback. We can’t do this lesson without the feedback to do the next one.”

Students spoke of the impacts of the stress on their lives and how they chose to cope with the stress. Two of the seniors admitted to experiencing panic attacks during the course. For example, Kelly (Sr.) said, “I did have several panic attacks. It was not good to(sic) my mental health for sure. It was a pretty traumatizing experience.” When asked how they dealt with the stress many students admitted to just not doing their work. “I just didn’t do it” (Maria, Jr.). The juniors’ focus was on not completing the online videos required in the flipped classroom portion of the teaching methods course. “I just quit watching the online lecture” (Maria, Jr.). “I tried to watch as many of the videos as I could … We would have a lot of times where a lot of people in the class the next day would be like we didn’t see the video” (Jackie, Jr.). However, the seniors admitted to not completing lesson plans for the teaching methods course.

Because of the panic attacks, after the first lesson plan, I didn’t turn in any other lesson plans. My grade suffered and I barely skimmed by, but I did not turn them in because I had more things that I needed to take care of (Ally, Sr.).
David (Sr.) followed up on that thought. “I didn’t do one of them too and it was because it’s like I could spend five hours trying to make the perfect lesson plan or I could just not do it.”

Another senior addressed how the amount of classwork impacted his physical health.

I was staying up until three, four in the morning, getting up at seven, being at class, going to work, staying up until four or five o’clock, and I got sick four times last semester and I don’t get sick. Because I was run down so much, I was sleeping two to three hours a night and that was it (Adam, Sr.).

Another senior talked about the impact of the stress from the courses on her home-life. “I know there’s a few of us too that have families, like little kids, and all that suffers. Everything suffers because you’re trying to concentrate on this and your family suffers and everything” (Ann, Sr.).

Challenges

Students in both focus groups discussed issues related to clarity of expectations, schedule of coursework, types of assessments, and rapport with professors. Several students identified issues with clarity in expectations which stemmed from ineffective planning and communication. Shelly (Sr.) said, “I don’t think it was very well thought out.” Mia (Jr.) also noted, “I believe 4202 [curriculum design] had a direct point of what the goal was, which was writing curriculum. … 4200 [teaching methods] to me was not as clear about what we were supposed to gain.” Morgan (Jr.) expanded on the previous response saying,

[It’s] not like the way it [curriculum design] was taught was bad, but it was very scattered, was a good way to put it. Like, lectures in person, lectures online, quizzes online, teaching different inquiry-based learning and then different sections that we were teaching I felt like it wasn’t quite as clear that this is exactly what we wanted. It’s not like this is the right way to do it, this is the wrong way to do it, so it was kind of like stumbling, not stumbling through the dark, but you just have to stumble through the dark a little bit.

Another student remarked,

I think planning from the very, very top has kind of caused most of these issues. And if the entire class had been planned and thought out a little bit better then maybe the communication, maybe the grading, maybe the expectations and everything would’ve been better (Claire, Sr.).

Hannah (M.S.) stated, “I didn’t see the connection from professor to professor. Dr. Smith tried his best. Dr. Jones tried his best. But not communicating hindered that.”

They noted inconsistencies in expectations between the two courses. Aaron (Jr.) shared his confusion.

The goal of it, I feel, was to take what we had done in the curriculum class and then put it into use in the methods class. And, that worked except some things in the methods class weren’t the same that we were learning in the curriculum class and vice versa so it threw us off a little bit. But, it helped that we had the same TA so we could work out those problems.
Another student noted the challenges of unclear expectations. “I thought that it was difficult because we were developing curriculum, but then we didn’t know exactly how they wanted us to teach it” (Tanya, M. S.).

Several of the students underscored issues with when the coursework was offered during their program of study. The juniors, who were mostly transfer students, felt ill-prepared to take these courses during their first semester in the program and at the university. “I just feel like it was my first semester here and I’ve never taken teaching classes before. It was a lot. In the second or third week we had to have pretty much our whole curriculum done” (Abigail, Jr.). Another student remarked,

There were a lot of the seniors that we were taking that class with that had addressed to me that these were the hardest classes that they had taken at UF the whole time that they had been here. And we’re taking them as our first class. And a lot of them are transfers too. Some of them came in as freshmen, but myself and the transfer students, it was my first class at UF and I have the seniors saying it’s the hardest class they have to take (Aaron, Jr.)

Students did not feel that the assessments used were the most accurate. For example, when referring to quizzes based on the online lecture, one student said, “… [The professor] was expecting us to come regurgitate in a memorization pattern which is not okay for a student to try and learn the material and synthesize it” (Mia, Jr.). Another student said,

That class [teaching methods] didn’t offer really a proper assessment to how we were learning. … I also felt that the quizzes [in curriculum design] that we were given were unfair because the quizzes didn’t properly assess what we were talking about or learning. So for example, a lot of the quizzes were very short answer type questions, and they were multiple choice. We never really would kinda go back to those assessments and talk about what was the right answer, what should’ve been on that. So I just felt like there were challenges to both classes but they were both a little bit different (Tim, Sr.).

Some students commented on the lack of rapport they had with one of the professors.

I know some of us felt that it was kind of awkward going from a professor that we know so well and knows us so well to a professor that we’ve seen in passing. Getting to know professors better I think might have been a little bit easier, but going from one class and then jumping into one where you don’t really know the professor is kind of like, who are you and why are you telling me what to do? (Jen, Sr.)

Mia (Jr.) shared similar thoughts.

Not once, I don’t think and I’m going to be completely honest, that I think Dr. Smith offered to meet with any students or try to watch our presentations, see how we were doing in the class, ask if we were adequately understanding or even getting anything out of his videos. So that’s why I think a lot of us felt that disconnect and had issues with the class.

In response to the previous comment another student replied, “I mean it’s hard to put in that many hours a week when you feel like your time isn’t appreciated at all” (Maria, Jr.).
Benefits

The students did acknowledge benefits they recognized from the condensed course structure. Benefits included, learning good time management skills, realizing the amount of time it took to create lessons, the amount of information they learned, and the value of the laboratory experience. Jackie (Jr.) highlighted the first two benefits in one statement.

I think the class definitely helped us learn a little bit of time management tools, and the amount of time that it takes to make lesson plans and curriculum maps and all of that good stuff. So, in that sense I think it did a good job at preparing us for the time challenges we’ll have to meet when we’re actually in the field.

The students realized that they learned a lot through the semester.

The curriculum development part of the class, was really, really good. I feel like I learned a tremendous amount from where to find certain things, how to structure it, why things are structured the way they are, and how to incorporate different teaching methods in a lesson plan. Why you should leave the sub plans that are very easy to read, like that kind of stuff. I really learned a lot (Maria, Jr.).

Jen (Sr.) offered similar thoughts.

I know for a lot of us, whenever we went into it, whenever we were talking about teaching and making lesson plans, and we had to make lesson plans for other classes, we thought about the activity and then matched it with something that you would teach in that class. And because we had the curriculum class and then the teaching methods class, they made us flip our brains around where you have to look at your standards and then plan from there. So I felt that was advantageous especially when you did the internship and getting classes that maybe you haven’t taught before, you really have to look at those standards and then match something that the students would enjoy.

Casey (Sr.) shared another account.

I feel it was pretty well stressed to us like she said, start with your standards, then come up with your objectives, that’s something that stuck in my mind, when throughout my internship when I was creating a lesson plan I would identify my objectives first and then I would worry about what am I going to do with these. So I thought that was something I took away from it.

The laboratory periods associated with the courses were valued by the students. Although they acknowledged that they were “not like a real-life classroom” (Beth, Sr.), they acknowledged that “the labs were really helpful, especially since we got to provide feedback to one another, and hear from our classmates. … it’s still great that you get to go through the practice of going through your whole entire lesson” (Beth, Sr.). Tanya (M.S.) said, “I liked watching each other teach and the way that we taught in front of our peers and were able to have that safe environment to help each other and learn different strategies and techniques from each other.”
Objective two sought to describe preservice teachers’ perceptions of content mastery and confidence while enrolled in two accelerated courses. Table 1 reports the means for each learning objective identified in the instructional design course. The learning objectives with the highest means, indicating the highest level of preservice teachers’ perceptions of content mastery and confidence, were create a course syllabus for a class ($M = 4.52; SD = 0.58$) and successfully and independently develop a unit plan for a course ($M = 4.44; SD = 0.58$).

Table 1

Preservice Teacher Confidence in Instructional Design After Completing An Accelerated Course

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create a course syllabus for a class</td>
<td>4.52</td>
<td>0.58</td>
</tr>
<tr>
<td>Successfully and independently develop a unit plan for a course</td>
<td>4.44</td>
<td>0.58</td>
</tr>
<tr>
<td>Write daily instructional plans for a course</td>
<td>4.37</td>
<td>0.79</td>
</tr>
<tr>
<td>Create behavioral objectives according to Bloom’s Taxonomy</td>
<td>4.30</td>
<td>0.72</td>
</tr>
<tr>
<td>Select appropriate formative assessment strategies</td>
<td>4.30</td>
<td>0.72</td>
</tr>
<tr>
<td>Create a grading rubric for a course assignment that effectively measures student performance</td>
<td>4.26</td>
<td>0.81</td>
</tr>
<tr>
<td>Create a written assessment</td>
<td>4.23</td>
<td>0.91</td>
</tr>
<tr>
<td>Successfully create essential questions that guide course planning</td>
<td>4.19</td>
<td>0.88</td>
</tr>
<tr>
<td>Incorporating differentiated instructional strategies to meet a variety of learners</td>
<td>4.15</td>
<td>0.66</td>
</tr>
<tr>
<td>Use the Understanding by Design process to create course curriculum</td>
<td>4.11</td>
<td>0.64</td>
</tr>
<tr>
<td>Generate appropriate student feedback</td>
<td>4.11</td>
<td>0.80</td>
</tr>
<tr>
<td>Create a curriculum map for a course</td>
<td>3.96</td>
<td>0.71</td>
</tr>
<tr>
<td>Create a classroom management plan</td>
<td>3.89</td>
<td>0.85</td>
</tr>
<tr>
<td>Utilize student data appropriate to inform curriculum decisions</td>
<td>3.78</td>
<td>0.85</td>
</tr>
<tr>
<td>Explain Roberts and Ball’s (2009) model for agricultural subject matter</td>
<td>3.11</td>
<td>1.01</td>
</tr>
</tbody>
</table>

*Note.* Scale range was (1=strongly disagree to 5=strongly agree)

Table 2 reports the means for each learning objective identified in the teaching methods course. The learning objectives with the highest means were use lecture as a teaching technique in my lessons ($M = 4.59; SD = 0.50$) and use an interest approach or activity design to stimulate student interest in my teaching ($M = 4.48; SD = 0.64$).
Table 2

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use lecture as a teaching technique in my lessons</td>
<td>4.59</td>
<td>0.50</td>
</tr>
<tr>
<td>Use an interest approach or activity design to stimulate student interest in my teaching</td>
<td>4.48</td>
<td>0.64</td>
</tr>
<tr>
<td>Use demonstration teaching techniques in my lessons</td>
<td>4.44</td>
<td>0.70</td>
</tr>
<tr>
<td>Summarize a lesson while teaching in a classroom</td>
<td>4.37</td>
<td>0.57</td>
</tr>
<tr>
<td>Use questioning as a teaching technique in my lessons</td>
<td>4.37</td>
<td>0.69</td>
</tr>
<tr>
<td>Use student-centered learning activities appropriately while I teach in the classroom</td>
<td>4.30</td>
<td>0.54</td>
</tr>
<tr>
<td>Use cooperative learning activities when I teach in the classroom</td>
<td>4.30</td>
<td>0.54</td>
</tr>
<tr>
<td>Use teacher-centered learning activities when I teach in the classroom</td>
<td>4.30</td>
<td>0.47</td>
</tr>
<tr>
<td>Apply characteristics of good instruction and teaching when I teach in the classroom</td>
<td>4.26</td>
<td>0.71</td>
</tr>
<tr>
<td>Identify factors affecting individual learner differences</td>
<td>4.04</td>
<td>0.90</td>
</tr>
<tr>
<td>Effectively use case studies as a teaching technique in my lessons</td>
<td>4.00</td>
<td>0.69</td>
</tr>
<tr>
<td>Use inquiry teaching techniques while teaching in a classroom</td>
<td>4.00</td>
<td>0.83</td>
</tr>
<tr>
<td>Prepare lesson plans that address diversity in student populations</td>
<td>3.96</td>
<td>0.85</td>
</tr>
<tr>
<td>Use educational technology while I teach in the classroom</td>
<td>3.85</td>
<td>1.13</td>
</tr>
<tr>
<td>Effectively manage student behavior while teaching in a classroom</td>
<td>3.63</td>
<td>1.18</td>
</tr>
</tbody>
</table>

Note. Scale range was 1=strongly disagree to 5=strongly agree.

Conclusions, Recommendations, and Implications

Based on the results, several conclusions can be drawn. First, students were largely dissatisfied with the accelerated class format. They reported feeling stressed and noted many challenges to meeting course expectations in the accelerated format. However, they did note some benefits like time management and realistic expectations for teachers. Similar student challenges were identified by Hyun et al. (2006) and Lee and Horsfall (2010). Concerns raised by students regarding instructor characteristics, teaching methods, and evaluation methods align with the perceptions of students in Scott’s (2003) description of attributes of high-quality intensive learning experiences. Based on student perceptions in this study, these courses did not meet Scott’s criteria.

Secondly, students perceived they mastered the concepts from both courses. Although they did not prefer the accelerated course structure, it appears to have been successful in helping students gain confidence in necessary skills. From a UbD perspective (Wiggins & McTighe, 2005), the courses were successful. However, it is important to note this was self-perceived mastery and confidence, not actual demonstration of mastery or knowledge. Additionally, a pre-test of confidence in content was not collected to determine how the students’ confidence changed after completion of the courses. Another influence on the students’ perceptions of content mastery was that data were collected a full semester after the courses were completed. The seniors may have
gained confidence in their abilities through their supervised teaching experiences, and the juniors may have gathered confidence during their spring courses.

Overall, based on results of this research, it is recommended that the courses be reformatted back to the traditional semester delivery until additional data can be collected. The original motive was to sequence the delivery of the courses so students take the curriculum design course prior to the teaching methods course. It is recommended that the curriculum design course be moved to the semester prior to the teaching methods course. Other universities exploring the accelerated course structure should consider affective and cognitive outcomes. Additionally, universities should carefully review their entire teacher education curricula before adopting an accelerated course format. An experimental design could explore differences in students’ learning, confidence, and satisfaction between the traditional and accelerated course format through a longitudinal study over two to three years. This may provide more accurate justification for using one course design over another.

The results from this study cannot be generalized; however, the findings should provide guidance to educators who offer accelerated courses. Ensuring open and transparent communication between students and instructors can help to decrease stress levels and perceptions of challenges. Also, if accelerated courses are to be taught in tandem with different instructors, care should be taken to ensure the connection and coherence of course content and assignments (Darling-Hammond & Bransford, 2005). A final recommendation is to adjust the teaching methods, assignments, and evaluations to be appropriate for the accelerated pace (Scott, 2003). Although initial feedback from students was not positive, they did perceive to have mastered concepts from both courses. Future research could follow-up with students after some time has passed to see if they still have similar perceptions of the format. Additionally, students’ actual performance during their student teaching internships could be a better indicator of content mastery.

References


Employee Perceptions of Branding Materials and External Communications for a State Forestry Organization

Quisto Settle¹, Lauri M. Baker,² & Tracy Irani³

Abstract

The purpose of this study was to assess the Florida Forest Service (FFS) employees’ perceptions of the organization’s external branding materials through an online survey. Employees had positive perceptions of the mission statement, including it being accurate and differentiating FFS from other organizations. Perceptions of the new change were relatively neutral. Employees believed the public received most its information about FFS from television, workshops, websites, and print articles. Employees believed television, websites, and print articles were the most important communication channels for FFS to communicate to the public in general. Employees believed television, radio, and websites were the most important for emergency information. While employees believed FFS’s external communications were important, they did not consider the communications effective or consistent. There are three recommendations for practitioners: use multiple channels of communication to reach the public, understand target demographic groups when selecting communication channels, and consistently represent the brand in external communications. There are three recommendations for research: assess the relationship between employee and public perceptions of which communications channels should be used, compare employees’ perceptions of the importance of different communications channels to actual effectiveness of the different communications channels, and continue research into internal perspectives of public organizations’ brands.

Keywords: communications; forestry; employees; branding; public organizations

Notes: Project was funded by the Florida Forest Service as a part of research conducted by the Center for Public Issues Education in Agriculture & Natural Resources at the University of Florida.

Introduction & Literature Review

The Florida Forest Service (FFS) began in 1927 “to gather and disseminate information on forests, their care and management, to prevent and extinguish forest fires, and to enforce all laws pertaining to forests and woodlands” and was organized by the Florida Board of Forestry to protect and develop forests in Florida (Florida Forestry Association, n.d., para. 5). FFS’s activities include suppression and prevention of wildfires, managing state forests, and landowner assistance (Florida

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Forest Service, n.d.). FFS changed its name from the Division of Forestry to Florida Forest Service during the summer of 2011, which led to research about the rebranding efforts, including this study.

FFS is a public organization. Public organizations face unique barriers because they are mandated through government and political processes (Moore, 1995). Public organizations have faced increasing pressures for accountability, including implementing more private sector approaches (Moore, 1995; Walsh, 1994). This includes increasingly using private-sector communication and marketing strategies, though implementation of these strategies is not well understood for public organizations (Butler & Collins, 1995; Laing, 2003; Moore, 1995; Walsh, 1994). Public organizations require public support to remain viable (Hoggett, 2006; Moore, 1995) and effective branding is a way to build relationships between the organizations and the public (Whelan, Davies, Walsh, & Bourke, 2010).

First, branding as a framework will be discussed, including the importance of employees and external communications for branding. The section will conclude with a discussion of public organizations and how being a public organization affects branding efforts.

**Branding as a Framework**

“A brand is a complex, interrelated system of management decisions and consumer reactions that identifies a product (goods, services, or ideas), builds awareness of it, and creates meaning for it” (Franzen & Moriarty, 2009, p. 6). To understand branding requires a systems-based approach because, while branding consists of individual components (e.g., external communications, employee perceptions), it is how these components come together that determines what the brand becomes (Franzen & Moriarty, 2009). Brands are similar to icebergs, where the visible component (e.g., external communications, logos) is important but less important to the overall brand than the component below the surface (e.g., organizational culture, employees and their perceptions; de Chernatony, 2001). Two of the major areas where members of the public shape their perceptions of the brand are the external communications of the brand and the public’s interactions with the organization’s employees, who are an internal component of the brand. The systems-level approach to branding underpins the approach of the current study to assess internal perceptions of FFS’s external brand. Past research has studied public perceptions of the FFS brand (Settle et al., 2015), but research is needed on internal perceptions to fully understand the brand.

**Branding & Employees**

Branding began as a concept related to selling a product or service to external stakeholders. In recent years, the internal branding of the organization directed toward members of the organization has begun receiving more attention and importance because the actions of the organization and its employees are the largest portion of the brand (Corley, Cochran, & Comstock, 2000; de Chernatony, 2001; Devasagayam, Buff, Aurand, & Judson, 2010; Veloutsou, 2008). Branding shapes the interactions between the employees and the organization, not just the interaction between the organization and the public (Kornberger, 2010).

Internal and external branding efforts intertwine (Roper & Davies, 2010). When measuring employees’ perceptions of the brand’s image (i.e., employee perceptions of public perceptions of the brand), there are direct and indirect effects on employees (Corley et al., 2000). Direct effects are the interpretations employees make based on images and messages they receive about an organization. Indirect effects are based on the feedback employees receive from the public’s perception of the organization. Employees are regularly influenced by messages either received or filtered through external stakeholders (Scott & Lane, 2000). While external communications are an
important means of helping brands stand out, the public’s perceptions of the organization are also affected by interactions with employees, including employees’ perceptions of the organization (Aaker, 1996; de Chernatony, 2001; Kimpakorn & Tocquer, 2010).

Because most of a brand’s success stems from employees and their actions (de Chernatony, 2001), a brand needs to be successful with its employees before it can be successful with the public. Effective branding serves as a promise to the public that an organization is going to meet a certain level of performance, and everyone in the organization needs to work to carry out this promise (Tybout & Calkins, 2005).

An interesting relationship between branding and external communications comes from the proliferation of media and information sources. Salzer-Mörling and Strannegård (2004) stated that because there is too much information available to the public, impressions from branding are what members of the public use to make decisions. Given that brands exist primarily as the public’s perceptions (Franzen & Moriarty, 2009), external communication has a key role in branding because that is one of the primary ways the public interacts with a brand, even though the internal brand structures will still have the largest role in the success or failure of a brand (de Chernatony, 2001).

Public Organizations

Increased competition in the public sector is leading to public organizations increasingly using marketing techniques (Walsh, 1994). Public organizations depend on maintaining public value for viability. This public value stems from providing a service or product that cannot or is not reasonably met by private organizations and satisfies those who directly benefit from the service or product, as well as the general public (Hoggett, 2006; Moore, 1995). Public value is especially important because governmental budget problems are decreasing the amount of funding available for public organization (Chernew, Baicker, & Hsu, 2010).

Branding helps foster relationships between the public and the brand, which improves the public’s satisfaction with the organization (Whelan et al., 2010). A positive brand reduces uncertainty for members of the public when selecting the brand, which is advantageous in a time where competition is increasing over limited public funding (de Chernatony, 2001; Franzen & Moriarty, 2009; Keller & Lehmann, 2006; Moore, 1995; Tybout & Cornelius, 2006; Walsh, 1994). Through relationships with members of the public, employees affect public perceptions of organizations and their brands (Bitner, Booms, & Mohr, 1994; Bitner, Booms, & Tetreault, 1990; Franzen & Moriarty, 2009).

In general, the application of private-sector strategies is not well understood for public organizations (Butler & Collins, 1995; Laing, 2003; Moore, 1995; Walsh, 1994), including a dearth of branding literature (Wæraas, 2008). Part of the reason application of private-sector strategies is not well understood is because there are factors that typically make public organizations more complicated than private organizations: Public organizations must have approval from the majority of the public, not just individuals who receive the service or product (Hoggett, 2006; Moore, 1995); public organizations need to represent their multiple roles and identities to avoid harming the brand’s credibility, such as those represented in a mission statement (Hoggett, 2006; Wæraas, 2008, 2010), and this credibility is needed for their success (Erden & Swait, 2004); public organizations need to avoid duplicating the roles of other public organizations to avoid negative public perception (Settle et al., 2015); and public organizations need to accurately reflect the organization and its multiple roles in external communications to avoid harming credibility (Trueman & Cornelius, 2006; Wæraas, 2008, 2010).
Purpose & Objectives

Public organizations need to effectively communicate with the public to ensure their viability (Hoggett, 2006; Moore, 1995). While it is important to understand public perceptions of the brand’s communications materials, it is also important to understand employees’ perceptions of these materials because of the cyclical relationship between internal and external brand perceptions (de Chernatony, 2001; Devasagayam et al., 2010). This research addresses the American Association for Agricultural Education National Research Agenda’s Research Priority 1: Public and Policy Maker Understanding of Agriculture and Natural Resources (Enns, Martin, & Spielmaker, 2016) by addressing how organizations, specifically the Florida Forest Service, can improve their brands. Previous research has shown that the public holds positive perceptions of FFS but mixed perceptions for many external branding materials (Settle et al., 2012), but research is needed to assess employees’ perceptions of the brand. The purpose of this research was to assess employees’ perceptions of branding materials and external communications of FFS. The objectives of this study were

1. Describe employee perceptions of FFS’s name and mission statement.
2. Describe employee perceptions of FFS’s external communications, including perceptions of sources of information and overall effectiveness of FFS’s external communications.

Methods

An online survey was used to assess the perceptions of all full-time employees of FFS (N = 1175), which was the target population for the study. To solicit participation in the study, the director of FFS sent the employees an e-mail asking for participation. A reminder e-mail was sent four days later. The final number of respondents was 593 (50.4%), which excludes incomplete responses. Because the director of the organization sent the e-mails soliciting participation, it was not possible to ensure contacts completely adhered to the recommendations of Dillman, Smyth, and Christian (2009) to send successive e-mail waves until the number of new responses was no longer great enough to warrant further contacts.

Early respondents were compared to late respondents to address the potential for non-response error (Lindner, Murphy, & Briers, 2001). Operationally, early respondents were those who completed the questionnaire before the reminder e-mail was sent, and late respondents were those who completed the questionnaire after the reminder e-mail was sent. There was a statistically significant difference between early and late respondents for one item, which is noted in the results section. Results for all other questions did not differ at a statistically significant level, indicating the results can be generalized beyond the respondents to the entire organization, which included all full-time employees of the organization.

The questionnaire was researcher-developed to address the purpose and objectives of the study. Researchers familiar with survey methodology and individuals within FFS evaluated the instrument for face and content validity (i.e., the extent the items appear to measure the intended construct; Fraenkel & Wallen, 2006). This panel also aided the development of the questionnaire to address the branding concepts that would be appropriate for FFS. The sections of the questionnaire in this paper included employee perceptions FFS’s mission statement, new name, external communications, and communication channels used for reaching the public, including which channels are used the most and which are the most important. Five-point scales were used for all questions, except for addressing where employees believed the public received most of its information about FFS, which was measured with frequency counts and percentages.
Results

Objective 1: Describe employee perceptions of the Florida Forest Service name and mission statement

Table 1 shows that employees liked the mission statement ($M = 4.5, SD = 1.0$), believed it was an accurate representation of the organization ($M = 4.3, SD = 1.1$), and that it helped differentiate FFS from other organizations ($M = 4.0, SD = 1.2$). Evaluations of the name change ($M = 3.3, SD = 1.5$) and the name itself were not as positive ($M = 3.6, SD = 1.4$). While employees’ evaluations of the name and name change were not negative, they were not positive either.

Table 1

Employees’ Evaluation of the FFS’s Mission Statement and Name Change.

<table>
<thead>
<tr>
<th></th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>I like this mission statement.</td>
<td>4.5</td>
<td>1.0</td>
</tr>
<tr>
<td>I believe this mission statement is an accurate representation of the Florida Forest Service.</td>
<td>4.3</td>
<td>1.1</td>
</tr>
<tr>
<td>I believe this mission statement helps differentiate the Florida Forest Service from other organizations.</td>
<td>4.0</td>
<td>1.2</td>
</tr>
<tr>
<td>I believe the name Florida Forest Service is effective for communicating the duties of the division.</td>
<td>3.6</td>
<td>1.4</td>
</tr>
<tr>
<td>I believe it was a good idea to change the name from Division of Forestry to Florida Forest Service.</td>
<td>3.3</td>
<td>1.5</td>
</tr>
</tbody>
</table>

*Note. Scale ranged from 1 = Disagree to 5 = Agree.*

Objective 2: Describe employee perceptions of the Florida Forest Service’s external communications

Table 2 shows employees’ perceptions of where employees believe the public receives most of its information about FFS. Television (32.0%) was the medium employees believed the public received most of its information. Workshops, demonstrations, and presentations (17.1%), websites (15.9%), and print articles (15.1%) were the next tier of information sources. E-mail (0.2%), radio (1.2%), and social media (1.6%) received the fewest responses from FFS employees.
Table 2

*Employees’ Perceptions of Where The Public Receives Most of Its Information About FFS*

<table>
<thead>
<tr>
<th>Information Source</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Television</td>
<td>185</td>
<td>32.0</td>
</tr>
<tr>
<td>Workshops, demonstrations, and presentations</td>
<td>99</td>
<td>17.1</td>
</tr>
<tr>
<td>Websites</td>
<td>92</td>
<td>15.9</td>
</tr>
<tr>
<td>Print Articles (newspapers, magazines)</td>
<td>87</td>
<td>15.1</td>
</tr>
<tr>
<td>Advertising, such as billboards, movie theater ads, and other signs</td>
<td>53</td>
<td>9.2</td>
</tr>
<tr>
<td>Flyers, posters, and handouts</td>
<td>45</td>
<td>7.8</td>
</tr>
<tr>
<td>Social Media (Twitter, Facebook, YouTube, etc.)</td>
<td>9</td>
<td>1.6</td>
</tr>
<tr>
<td>Radio</td>
<td>7</td>
<td>1.2</td>
</tr>
<tr>
<td>E-mail</td>
<td>1</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Table 3 shows employees’ perception of the importance of different communications channels for communicating FFS’s duties to the public. Television ($M = 4.7, SD = 0.8$), websites ($M = 4.5, SD = 0.8$), and print articles ($M = 4.5, SD = 0.8$) were perceived as the most important. Like their evaluation of being the least-used information sources, text messaging ($M = 2.8, SD = 1.2$), e-mail ($M = 3.5, SD = 1.2$), and social media ($M = 3.6, SD = 1.3$) were viewed as least important for conveying FFS’s duties to the public.

Table 3

*Employees’ Perceived Importance of Communications Channels for Communicating FFS’s Duties to the Public.*

<table>
<thead>
<tr>
<th>Information Source</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Television</td>
<td>4.7</td>
<td>0.8</td>
</tr>
<tr>
<td>Websites</td>
<td>4.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Print Articles (newspapers, magazines)</td>
<td>4.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Workshops, demonstrations, and presentations</td>
<td>4.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Advertising, such as billboards, movie theater ads, and other signs</td>
<td>4.2</td>
<td>1.1</td>
</tr>
<tr>
<td>Radio</td>
<td>4.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Flyers, posters, and handouts</td>
<td>4.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Social Media (Twitter, Facebook, YouTube, etc.)</td>
<td>3.6</td>
<td>1.3</td>
</tr>
<tr>
<td>E-mail</td>
<td>3.5</td>
<td>1.2</td>
</tr>
<tr>
<td>Text Messaging</td>
<td>2.8</td>
<td>1.2</td>
</tr>
</tbody>
</table>

*Note.* Scale ranged from $1 = Unimportant$ to $5 = Important$. 
Table 4 shows which communication channels employees believed were the most important for conveying emergency information to the public. Television ($M = 4.9$, $SD = 0.5$), radio ($M = 4.7$, $SD = 0.7$), and websites ($M = 4.3$, $SD = 1.0$) were rated the most important. The least important were text messaging ($M = 3.3$, $SD = 1.4$) and e-mail ($M = 3.7$, $SD = 1.3$). Employees’ perceptions of the same communications channels reported in Table 3 differed when they were evaluating the communication channels’ importance for FFS to communicate emergency information to the public reported in Table 4. The differences were the widest for radio (+0.6); text messaging (+0.5); workshops, demonstrations, and presentations (-0.5); and advertising (-0.4).

Table 4

| Employees’ Perceived Importance of Communications Channels for FFS to Communicate Emergency Information to the Public. |
|---|---|---|
| Channel | $M$ | $SD$ |
| Television | 4.9 | 0.5 |
| Radio | 4.7 | 0.7 |
| Websites | 4.3 | 1.0 |
| Print Articles (newspapers, magazines) | 4.2 | 1.1 |
| Social Media (Twitter, Facebook, YouTube, etc.) | 3.8 | 1.3 |
| Workshops, demonstrations, and presentations | 3.8 | 1.3 |
| Advertising, such as billboards, movie theater ads, and other signs* | 3.8 | 1.3 |
| Flyers, posters, and handouts | 3.8 | 1.2 |
| E-mail | 3.7 | 1.3 |
| Text Messaging | 3.3 | 1.4 |

*Note. Scale ranged from 1 = Unimportant to 5 = Important.

Employees also evaluated FFS’s external communications, with items for these questions ranged from 1 representing unimportant, ineffective, and inconsistent to 5 representing important, effective, and consistent. While external communications were perceived as important ($M = 4.8$, $SD = 0.6$), the effectiveness ($M = 3.5$, $SD = 1.2$) and consistency ($M = 3.4$, $SD = 1.2$) of FFS’s external communications received relatively neutral evaluations.

Conclusions

Employees had a positive evaluation of the mission statement, but they held mixed perceptions of the name change. Employees’ perceptions that the mission statement aided differentiation from other organizations are important given the value the public places on differentiation between public organizations (Settle et al., 2015). The name change perceptions were consistent with members of the public who held mixed perceptions of the Florida Forest Service name change (Settle et al., 2012). As for communicating FFS’s purpose to the public, the employees’ perceptions favored certain communication channels. Effectiveness of external communications will be affected by choosing the appropriate communication media (Weiss &
Tschirhart, 1994), which is important because members of the public have varying preferences for communication channels (Settle et al., 2012).

In making these communication channels choices, it is important to note there are sometimes conflicts in pleasing the public. For example, the public values low-cost communications for public organizations’ communications (Settle et al., 2012), but past research has found that email, which most Americans use, would not be well-received by members of the public (Settle et al., 2012; Zickuhr & Smith, 2012). Public organizations need to walk a tightrope of employing effective, low-cost communications that the public and employees perceive positively. In FFS’s case, both employees and the public did not positively perceive email, which is one of those low-cost options. This complicates communication decisions.

Compared to communicating about FFS’s purpose, there were differences for communicating emergency information to the public. Employees placed more importance on channels that could be updated frequently, such as radio and television, and were less favorable toward channels that were more time intensive, such as workshops. While text-messaging was one of the higher-rated channels for emergency situations compared to other options, employees only evaluated it neutrally. This contrasts with research showing members of the public who live near forests want to receive text message alerts from FFS (Settle, 2012), which illustrates a gap between what the public and employees believe is the correct option.

These differences that are based on the type of information the organization is communicating are indicative of the larger issue of complications that occur for public organizations due to their multiple roles (Hoggett, 2006; Moore, 1995; Wæraas, 2008, 2010). FFS must make choices on how it communicates with its stakeholders based on the type of information being communicated, which is affected by the organization’s multiple roles. This same concept is important for other agricultural and natural resources public organizations, such as the U.S. Department of Agriculture (USDA) and the Cooperative Extension Service. Each communication choice could be affected by the role being embodied in that moment.

The employees’ evaluations of FFS’s external communications were relatively neutral in terms of effectiveness and consistency, though they attributed high importance to FFS’s external communications. The employees recognized the value of communicating with the public, but the employees did not believe it was being done well when the survey was administered. As the base of the organization, the employees’ perceptions will affect external perceptions of the brand through their interactions with members of the public (de Chernatony, 2001; Franzen & Moriarty, 2009). The potential effect on external perceptions is important because FFS is a public organization that requires public support to remain viable (Moore, 1995). Past research found the public was not well aware of FFS and its activities (Settle et al., 2012). External communications are vital for helping the public be more aware of FFS and its brand (Anschuetz, 1997; Ehrenberg et al., 1997; Franzen & Moriarty, 2009; Miller & Berry, 1998).

**Recommendations**

**For Practice**

While these recommendations stem from research conducted with FFS employees, the recommendations may be applicable to other settings, particularly other public organizations. The first recommendation for practitioners is to use multiple channels of communication to reach the public, depending on purpose and audience. Employees’ perceptions varied based on what was being communicated, and past research has found audience members have varying preferences for
how they would like to receive information (Settle et al., 2012), which provides support for using multiple channels of communication, depending on the audience and message. Other public organizations are likely to have a similar need for diverse communication choices due to the multiple roles public organizations have and needing to communicate with different audiences (Hoggett, 2006; Wæraas, 2008, 2010). In making choices between communication channels, practitioners need to understand their target audiences. Gathering employee feedback could also be advantageous because employees can gain valuable insight through interactions with members of the public. The better option is to collect information directly from target audiences, though costs of accessing a representative sample of the audience can limit viability for this option. As it relates to teaching students who will go into public organizations, such as Extension and USDA, faculty members should stress the importance of being able to effectively use multiple channels of communication, especially in agricultural communications and Extension education. Faculty members should also stress the importance of audience analysis to assess audiences’ preferred communication channels.

The second recommendation is to maintain consistent representation of the brand in all external communications (Thorson & Moore, 1996). Employees in the study believed FFS lacked this consistency and effectiveness. Inconsistency and ineffectiveness are likely to hurt brand perceptions. Students going to work for public organizations must understand the importance of building this consistent representation, which is made more difficult by public organizations’ multiple roles that need to be represented to avoid hurting credibility (Hoggett, 2006; Wæraas, 2008, 2010).

A note of caution is necessary when using external communications to promote the brand of a public organization. Because public organizations use public funding, money spent to promote the brand could be perceived negatively by members of the public, but communications that accomplish the purpose of the organization, such as public service announcements, are not likely to be perceived negatively (Settle et al., 2012; Whelan et al., 2010). With this in mind, the final recommendation for brand managers of public organizations is to avoid promoting the brand for the sake of promotion because it could negatively impact brand perceptions. Instead, communication efforts should be tailored toward accomplishing the purpose of the public organization. The perceived mismanagement of public funds is particularly important in today’s political climate where government finances are gaining prominence in political discourse (Chernew et al., 2010; Koba, 2012; Settle et al., 2015). As it relates to students, faculty members should convey how this era of increased scrutiny of public organizations will affect communication with audiences.

For Research

There are three recommendations for future research. The first is to quantitatively assess the similarities and differences between employee and public perceptions of which communication channels each group believes public organizations should be using. A public organization’s brand depends on approval from both groups, so it is important to understand commonalities and discrepancies between the perceptions of both groups. The discrepancies could be problematic because satisfying one group could lead to dissatisfaction for the other.

The second recommendation is to compare perceived importance of different communication channels with the actual effectiveness of those communication channels. Understanding actual effectiveness provides a fact-based reason for selecting certain communication channels over other options. This could help justify selection of communication channels and improve internal perceptions of the brand’s external communications.
The third recommendation is to continue research about internal perspectives of public organizations’ brands. Internal brand structures, including employee perceptions of external branding, affect public brand perceptions (Franzen & Moriarty, 2009). Employees help shape the external brand of the organization through their interactions with the public. Trying to understand the external brand without understanding the internal brand could be putting the proverbial cart before the horse.

References


Assessing the Technical Expertise and Content Needs of Alabama Agriscience Teachers

Christopher A. Clemons¹, Abigail E. Heidenreich,² & James R. Lindner³

Abstract

The purpose of this study was to assess secondary agriscience teachers’ perceptions, expertise, and importance of agriculture content areas in the curriculum. To accomplish this study the following objectives framed the investigation: describe Alabama secondary agriscience teachers by personal characteristics including teacher certification pathway, describe Alabama secondary agriscience teachers by professional development needs, and explore the relationships between Alabama secondary agriscience teachers by professional development needs and personal characteristics. The population was representative of agriculture teachers in Alabama teaching agriscience education in grades 9-12. The data collection instrument included four thematic units: FFA/Leadership Development/SAE, Technical Agriculture, Program Management, and Teaching and Learning. Findings were evaluated using analytical triangulation between statements and individual item analysis. The areas of professional development needs were determined by the mean weighted discrepancy score (MWDS) in the four thematic categories. Alabama agriscience teachers identified competency areas with the highest MWDS as: FFA/Supervised Agricultural/Leadership Development (MWDS = 3.04), Technical Agriculture (MWDS = 2.48), Program Management (MWDS = 2.17), and Teaching and Learning (MWDS = 2.00).

Keywords: Needs Assessment; Professional Development; Technology; SAE; Critical Thinking

Introduction

Improving agricultural education practices requires considering the knowledge and skills needed by students today so teachers may address the challenges of tomorrow (McKim, Pauley, Velez, & Sorensen, 2017). The need for focused professional development is vital to the continued success of secondary agriculture education and teacher growth. This study addresses the needs of Alabama agriscience education teachers through qualitative inquiry and agriculture education through research priority five of the National Research Agenda “lead change or reform in agriculture education very often include some form of professional development” (Thoron, Myers, & Barrick, 2016, p. 43). Continuing education in agriculture education is vital to the success of all practitioners, regardless of the level of instruction. Shulman (1987) described the need for teachers to educate students according to the standards of the day, therefore, teachers need a deep and flexible understanding of content to provide guidance for student development in agricultural content. The acquisition of new teaching skills is accomplished through needs based professional development opportunities. When professional development opportunities do not align with the learning needs of teachers a misalignment of expectations and outcomes can diminish the opportunities for learning. Sharma (2016) stated "many professional development programs [rely]
on telling people what they should believe and how they should behave; providing them with information in the expectation that they will alter their behavior” (p. 469).

According to Phillip Paramore, former Executive Director for the Alabama FFA Association “there is a definitive gap in the knowledge we use to determine professional development in Alabama”. “Limited surveys have been presented asking teachers their needs, however, no investigation has occurred within the past fifteen years” (Personal Communication, April 4, 2017). Therefore, a void was present in the professional development being offered by the university system, professional development opportunities at state conferences, or state sponsored continuing education. A lack of research and assessment of teacher needs created a vacuum of assumed educational needs and the willingness of the agriscience teachers to participate for the continuing education credit being offered. Agriscience researchers at Auburn University initiated the competency and needs survey using the Borich Needs Assessment Model to correctly identify the professional development teachers were requesting.

**Theoretical Framework**

The theoretical framework for this study was based on Borich’s (1980) “Needs Assessment Model” and bound by the four areas of Pre-Service/Inservice need as reported by Duncan, Ricketts, Peake, and Uesseler, (2006): Technical Agriculture, FFA/Leadership Development/SAE, Teaching and Learning, and Program Management. The theoretical construct, as reported by Borich (1980) was the need for trainers to identify if a discrepancy exists between competency and importance of the lesson being taught. Borich (1980) further defined this polarization of needs as “what is and what should be” (p. 39) regarding training opportunities. Borich (1980) reported that trainings, or professional development opportunities can measure the discrepancy between competency and importance to determine effectiveness. The distance between competency and importance is an ideal measure when assessing the four areas of Pre-Service/In-service needs: technical agriculture, FFA/leadership development/SAE, teaching and learning, and program management.

Although many agricultural education programs have moved from traditional to non-traditional curriculum, Alabama teachers indicated a strong connection to foundational agriculture education content. As the educational content of agricultural education evolves, the need for traditional agriculture instruction and the FFA continues to be a vital component for students to develop a fundamental knowledge of the industry in Alabama. Martin and Enns (2017) reported this shift in curriculum is a reflection of conventional and non-conventional agriculturalists attitudes and these divergent viewpoints have challenged agricultural education students. Through shifts in traditional curriculum, FFA has maintained a model of applying learned skills, traditional or otherwise, for student growth and success. Shoulders and Toland (2017) emphasized the three-part model of agriculture education as a vital component of successful programs. As a component of the model, Talbert, Vaughn, Croom, and Lee (2007) stated that agriculture teachers operate programs with a relatively high degree of autonomy compared to teachers of academic subjects. It is the autonomy and control of subject matter and instruction which reflects Alabama teacher needs. In the absence of a rigid curricular framework, FFA instruction and organization of the program was identified as major component of need. The FFA is a vital component for application of student learning. Advisors and teachers should be skilled in the promotion of opportunities for the agricultural student. With the lack of a rigid curriculum structure in agriculture classrooms (Talbert, et al., 2007) instructional delivery models in the agriculture classroom should be developed and improved through professional development opportunities. The profession of agricultural education requires students to move beyond the basic skills and content knowledge. Instead, future agriculturalists must develop critical thinking and problem solving skills. (Van Beek, De Jong, Minnaert, & Wubbels, 2014).
Rubenstein and Thoron (2015) reported the importance of SAE in the high school classroom and postulated that the agriculture teacher was the most important influencer in the engagement of students in the SAE. Sorensen, Lambert, and McKim (2014), and Layfield and Dobbins (2002), in-service and needs study also reinforces the need for developing SAE needs for students and teacher support in South Carolina. Environmental, Technology, and Agriscience content are a common denominator between school districts. As curriculum needs and delivery models continue to evolve to meet the needs of 21st century learners, so will the concepts and lessons taught in the secondary agriculture classroom. Shumacher, Fuhrman, and Duncan (2012), reported environmental education should be proactive in the curriculum. Therefore, the continuing education of secondary teachers must possess components to meet these needs. The importance of teaching environmental and agriscience concepts is underscored by Wilson, Kirby, and Flowers (2002) wrote that biotechnology education should be integrated within the agriscience curriculum. Vallera and Bodzin (2016) reported that although agriculture has in most part been removed from the secondary curriculum, science and environmental education is being reincorporated for greater student development in science education. The reintegration of environmental science content is supported by teachers, parents, and administration through open curriculum exploration, collaboration, and integration within existing content areas (Shumacher, et al., 2012). The efforts to reincorporate environmental science as a component of agricultural education will require specialized technical training for secondary agricultural education students.

Technical skills are important beyond just topical use in the classroom and support student learning. Before students can gain appropriate technology skills for educational endeavors, teachers should be provided instruction and application of technology opportunities. Williams, Warner, Flowers, and Croom (2014) support the need for in-service opportunities focused on educator use of technology in agriculture classrooms. In relation to the specific content and technical needs of pre-service and early career agriscience teachers, need for classroom management and effectively managing student behavior strategies were sought through professional development. These needs are supported by previous research by Edwards and Briers (1999), Garton and Chung (1996), and Mundt and Conners (1999). Duncan, et al., (2006) reported professional development was needed for teachers working with special needs students. Stair, Warner, and Moore (2012) reported that professional development in special education is not always being addressed adequately within all educational programs. Duncan, et al., (2006) reported Georgia agriculture teachers demonstrated specific needs related to competencies for the inclusion of technology in the agriculture education course pathways. This outcome was supported by Davis and Jayaratne (2015) whose findings indicated the use of multimedia and the incorporation of the internet for curriculum development and delivery was an important training need for professional development and preparation. Saucier and McKim (2011) reported the need for additional or sometimes foundational training in the instruction of agriculture mechanics was often needed through improved coursework and professional development opportunities.

Purpose and Objectives

The purpose of this study was to identify the professional development needs of secondary agriscience teachers in Alabama and to determine factors influencing their professional learning needs. To accomplish this study the following objectives were used to frame the investigation:

1. Describe Alabama secondary agriscience teachers by personal characteristics including teacher certification pathway.
2. Describe Alabama secondary agriscience teachers by professional development needs.
3. Explore the relationships between Alabama secondary agriscience teachers by professional development needs and personal characteristics.
Methods

The population for this descriptive and correlational research study included all secondary agriscience teachers in Alabama (N = 309) instructing grades 9-12 during the 2016-2017 school year. A sample (n = 145) of the population was selecting using the Cochran’s (1977) formula for continuous variables. The instrument was designed to assess participant’s perceptions of competence and importance of listed items. A pilot study was conducted with a representative group of the participants of the study that were not part of the investigation. The pilot panel consisted of 15 secondary agriscience teachers in Alabama which were representative of the population being investigated but were not included in the final analysis. The pilot study addressed the following variables: level of difficult in syntax and sentence structure, time of completion, the level of appropriateness of the statements/questions, and organization and ease of use in the Qualtrics software program to account for content and face validity.

Participants were notified of the study through Qualtrics one week before the distribution of the study explaining the purpose, informed consent for participation, and the dates of the investigation. An invitation email was provided to participants which contained a web-based link for the survey and four email reminders to stimulate an increased response rate: 104 participants started the questionnaire, 87 participants completed components of the questionnaire and 45 participants finished the entire instrument. The results of the study account for statements and questions not answered within the sample population. According to Dillman, Smyth, and Christian (2014) questionnaire length, complexity, and legitimacy may negatively affect response rates. A combination of these characteristics may have led to reluctance to start or complete this questionnaire. Caution is warranted against generalizing the findings of this study beyond those participating.

The “Minnesota Beginning Agricultural Education Teacher In-Service Programming Needs Assessment” (Joerger, 2002) was used as the foundation for the questionnaire to collect data from participants. Duncan, et al., (2006) reported Joergers’ (2002) instrument was modified to include current trends in educational methodology, pedagogy, SAE record book programs, and critical thinking skills. The instrument for this study was designed using influences from Duncan, et. al (2006) and Borich’s Needs Assessment Model (1980). The instrument consisted of four professional development need areas that were established by Duncan et. al. (2006): FFA/Leadership Development/SAE, Technical Agriculture, Program Management, and Teaching and Learning. Borich’s Model (1980) is designed to measure a subject’s perception of importance of a skill or task and framed in the level of competence the subject possesses in carrying out the skill or task. The qualifiers for the scale used were 1) Not Important, 2) Of Little Importance, 3) Somewhat Important, 4) Important, or 5) Very Important and the competence qualifiers were 1) Not Competent, 2) Little Competence, 3) Somewhat Competent, 4) Competent, 5) Very Competent. According to Borich’s Model (1980) mean weighted discrepancy scores are an indicator of professional development need. MWDS are calculated by subtracting the competency score from the importance score and multiplying that number times the mean importance rating for each competency (Borich, 1980). The instrument contained five points of confidence where the true limits of the MWDS were -20 to 20. This process was the focus for the determination of applicable outcomes to best meet the needs of secondary agriscience teachers in Alabama.

Discrepancies with the greatest positive rank difference had the highest priority for teacher professional development (Borich, 1980). The importance and competence scores were used to calculate teacher competencies and levels of importance related to technical agriculture, FFA/leadership development/SAE, teaching and learning, and program management Mean
weighted discrepancy scores (MWDS) were calculated for individual competencies and for overall competency areas (Saucier, et. al., 2011).

**Findings**

The findings of this study identified four thematic units of professional development for practicing agricultural education teachers in Alabama. Participants indicated their level of need in the four thematic units consisting of specific needs statements: FFA/Leadership Development/SAE, Technical Agriculture, Program Management, and Teaching and Learning. Professional development needs were determined using the Mean Weighted Discrepancy Score (MWDS) with true limits ranging from -20 to 20. Personal characteristics of participants were collected to better define the demographics of the study respondents. Participants ages ($M = 40.74$, $SD = 10.48$) in years ranged from 24 to 62. Participants years of teaching ($M = 11.56$, $SD = 10.94$) ranged from 1-37. Approximately 39% of participants from the north region; 36% from the central region; and 25% from the south region of Alabama. Analysis of the study participant’s 58% percent received certification as an agriscience education teacher through an undergraduate agriscience education program and 42% were certified by completing a master’s degree in agriscience education with Alabama certification.

The areas of professional development needs were determined by the mean weighted discrepancy score (MWDS) in the four thematic categories. The MWDS score of each area were FFA/Leadership Development/Supervised Agricultural Experience Programs ($MWDS = 3.04$); Technical Agriculture ($MWDS = 2.48$); Program Management ($MWDS = 2.17$); and Teaching and Learning ($MWDS = 2.00$).

Table 1 shows professional development need by content area and MWDS ranking. FFA, Leadership Development, and Supervised Agricultural Education need ($MWDS=3.04$) was the highest MWDS ranked need. The content area in which participant had the lowest need was Teaching and Learning ($MWDS=2.00$). Individual items with highest overall needs were: Integrating current advances in agriculture technology into the curriculum; teaching students to think critically and creatively; teaching students to think critically and creatively; preparing SAE proficiency award applications; developing SAE opportunities for students; motivating students to learn; motivating students to learn; and conducting activities that support awards. Individual items that participants indicated that they had little to no professional development needs were: Evaluating the effectiveness of BIC meeting its intended purpose; conducting an adult program; conducting parent/teacher conferences; the use of computers in the classroom; planning and conducting student field trips; and planning FFA events and banquets.

### Overall Professional Development Need Statements by MWDS

<table>
<thead>
<tr>
<th>Content Areas</th>
<th>MWDS$^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFA/Leadership Development/SAE</td>
<td>3.04</td>
</tr>
<tr>
<td>Technical Agriculture</td>
<td>2.48</td>
</tr>
<tr>
<td>Program Management</td>
<td>2.17</td>
</tr>
<tr>
<td>Teaching and Learning</td>
<td>2.00</td>
</tr>
</tbody>
</table>

*Note. MWDS$^a$=Mean Weighted Discrepancy Score (True limits range from -20 to 20)*
As shown in Table 2, MWDS ranking of specific items with the content area of FFA, Leadership Development, and SAE showed the items with greatest need were: Preparing SAE proficiency award applications; developing SAE opportunities for students; and conducting activities that support the awards. Items that ranked lowest in this content area included: Planning FFA events and banquets; using FFA alumni chapters; and using agricultural education advisory councils.

Table 2

<table>
<thead>
<tr>
<th>Content Areas</th>
<th>MI^a</th>
<th>MC^b</th>
<th>MWDS^c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparing SAE proficiency award applications</td>
<td>4.13</td>
<td>3.07</td>
<td>4.41</td>
</tr>
<tr>
<td>Developing SAE opportunities for students</td>
<td>4.42</td>
<td>3.47</td>
<td>4.23</td>
</tr>
<tr>
<td>Conducting activities which support the National Chapter Award Program in Student, Chapter, and Community award areas</td>
<td>4.07</td>
<td>3.07</td>
<td>4.07</td>
</tr>
<tr>
<td>Preparing State and American FFA Degree award applications</td>
<td>4.02</td>
<td>3.09</td>
<td>3.75</td>
</tr>
<tr>
<td>Teaching electronic record book skills for SAEP (AET)</td>
<td>3.87</td>
<td>2.91</td>
<td>3.69</td>
</tr>
<tr>
<td>Providing career exploration in agriculture and related industries</td>
<td>4.47</td>
<td>3.64</td>
<td>3.67</td>
</tr>
<tr>
<td>Preparing Agriculture/FFA Career Development Event teams</td>
<td>4.44</td>
<td>3.64</td>
<td>3.56</td>
</tr>
<tr>
<td>Supervising students’ SAE program</td>
<td>4.36</td>
<td>3.56</td>
<td>3.48</td>
</tr>
<tr>
<td>Planning and executing successful fundraising programs</td>
<td>4.53</td>
<td>3.96</td>
<td>2.62</td>
</tr>
<tr>
<td>Coordinating activities with local agriculture organizations (Young Farmers, 4-H)</td>
<td>4.02</td>
<td>3.44</td>
<td>2.32</td>
</tr>
<tr>
<td>Developing an effective social media program for program information</td>
<td>3.69</td>
<td>3.11</td>
<td>2.13</td>
</tr>
<tr>
<td>Using an Agriculture Education Advisory Council</td>
<td>4.16</td>
<td>3.64</td>
<td>2.12</td>
</tr>
<tr>
<td>Using an FFA Alumni Chapter</td>
<td>3.49</td>
<td>3.07</td>
<td>1.47</td>
</tr>
<tr>
<td>Planning FFA events and banquets</td>
<td>4.07</td>
<td>3.82</td>
<td>0.99</td>
</tr>
</tbody>
</table>

Note. MI^a=Importance (1=Not important, 2=Of little Importance, 3=Somewhat important, 4=Important, 5=Very Important); MC^b=Competence (1=Not competent, 2=Little competence, 3=Somewhat competent, 4=Competent, 5=Very competence; MWDS^c=Mean Weighted Discrepancy Score (True limits range from -20 to 20)

As shown in Table 3, MWDS ranking of specific items with the content area of Technical Agriculture showed the items with greatest need were: Integrating current advances in agricultural technology into the curriculum; teaching skills and concepts in aquaculture; teaching skills and concepts in unmanned aerial vehicles and systems; teaching skill and concepts in construction management; and teaching skills and concepts in food products processing, operations, and management. Items that ranked lowest in this content area included; Using computers in the classroom; using multimedia equipment in teaching; and teaching agribusiness skills and concepts.
Table 3

*Technical Agriculture Need by MWDS*

<table>
<thead>
<tr>
<th>Content Areas</th>
<th>MI</th>
<th>MC</th>
<th>MWDS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technical Agriculture</strong></td>
<td></td>
<td></td>
<td>2.48</td>
</tr>
<tr>
<td>Integrating current advances in agriculture technology into the curriculum.</td>
<td>4.27</td>
<td>3.16</td>
<td>4.74</td>
</tr>
<tr>
<td>Teaching skills and concepts in aquaculture</td>
<td>3.73</td>
<td>2.76</td>
<td>3.65</td>
</tr>
<tr>
<td>Teaching skills and concepts in unmanned aerial vehicles and systems</td>
<td>2.98</td>
<td>1.84</td>
<td>3.37</td>
</tr>
<tr>
<td>Teaching skills and concepts in construction management</td>
<td>4.29</td>
<td>3.51</td>
<td>3.34</td>
</tr>
<tr>
<td>Teaching skills and concepts in food products processing, operations, and</td>
<td>3.93</td>
<td>3.09</td>
<td>3.32</td>
</tr>
<tr>
<td>management.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching skills and concepts in the animal sciences</td>
<td>4.40</td>
<td>3.76</td>
<td>2.84</td>
</tr>
<tr>
<td>Teaching skills and concepts in soils and soil management</td>
<td>4.40</td>
<td>3.80</td>
<td>2.64</td>
</tr>
<tr>
<td>Teaching agriscience (integrating science and agriculture)</td>
<td>4.47</td>
<td>3.91</td>
<td>2.48</td>
</tr>
<tr>
<td>Teaching skills and concepts in the animal sciences</td>
<td>4.38</td>
<td>3.84</td>
<td>2.33</td>
</tr>
<tr>
<td>Teaching skills and concepts in relationship to small engine systems</td>
<td>3.62</td>
<td>2.98</td>
<td>2.33</td>
</tr>
<tr>
<td>Teaching skills and concepts in landscape maintenance and design</td>
<td>4.02</td>
<td>3.49</td>
<td>2.15</td>
</tr>
<tr>
<td>Teaching skills and concepts in marketing agricultural products</td>
<td>3.93</td>
<td>3.40</td>
<td>2.10</td>
</tr>
<tr>
<td>Teaching skills and concepts in the plant sciences (horticulture, agronomic</td>
<td>4.31</td>
<td>3.84</td>
<td>2.01</td>
</tr>
<tr>
<td>crops, etc.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching skills and concepts in environmental sciences (wildlife management,</td>
<td>4.18</td>
<td>3.71</td>
<td>1.95</td>
</tr>
<tr>
<td>forestry, ecology)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching plant biotechnology skills and concepts</td>
<td>3.73</td>
<td>3.22</td>
<td>1.91</td>
</tr>
<tr>
<td>Teaching agribusiness skills and concepts</td>
<td>4.18</td>
<td>3.82</td>
<td>1.49</td>
</tr>
<tr>
<td>Using multimedia equipment in teaching</td>
<td>4.09</td>
<td>3.84</td>
<td>1.00</td>
</tr>
<tr>
<td>The use of computers in the classroom</td>
<td>4.05</td>
<td>3.91</td>
<td>0.54</td>
</tr>
</tbody>
</table>

Note. MI = Importance (1 = Not important, 2 = Of little Importance, 3 = Somewhat important, 4 = Important, 5 = Very Important); MC = Competence (1 = Not competent, 2 = Little competence, 3 = Somewhat competent, 4 = Competent, 5 = Very competence; MWDS = Mean Weighted Discrepancy Score (True limits range from -20 to 20)

As shown in Table 4, MWDS ranking of specific items with the content area of Program Management showed the items with greatest need were: Evaluating the local program; incorporating electronic record book programs such as AET; and CTE Directors having a strong understanding of the BIC process. Participants indicated that they had no professional development needs related to evaluating the effectiveness of BIC meeting its intended purpose.
Table 4

Program Management Need by MWDS

<table>
<thead>
<tr>
<th>Content Areas</th>
<th>MI</th>
<th>MC</th>
<th>MWDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Management</td>
<td></td>
<td></td>
<td>2.17</td>
</tr>
<tr>
<td>Evaluating the local program</td>
<td>4.40</td>
<td>3.58</td>
<td>3.62</td>
</tr>
<tr>
<td>Incorporating electronic record book programs such as AET</td>
<td>3.76</td>
<td>2.82</td>
<td>3.51</td>
</tr>
<tr>
<td>CTE Directors having a strong understanding of the BIC process</td>
<td>4.04</td>
<td>3.36</td>
<td>2.79</td>
</tr>
<tr>
<td>Conducting needs assessment surveys to determine the courses that should be taught in the curricula</td>
<td>3.96</td>
<td>3.49</td>
<td>1.85</td>
</tr>
<tr>
<td>Integrating Business and Industry Certification in the agriculture curriculum</td>
<td>3.89</td>
<td>3.49</td>
<td>1.56</td>
</tr>
<tr>
<td>Evaluating the effectiveness of BIC meeting its intended purpose</td>
<td>3.20</td>
<td>3.29</td>
<td>-0.28</td>
</tr>
</tbody>
</table>

Note. MI = Importance (1 = Not important, 2 = Of little Importance, 3 = Somewhat important, 4 = Important, 5 = Very Important); MC = Competence (1 = Not competent, 2 = Little competence, 3 = Somewhat competent, 4 = Competent, 5 = Very competence; MWDS = Mean Weighted Discrepancy Score (True limits range from -20 to 20)

As shown in Table 5, MWDS ranking of specific items with the content area of Teaching and Learning showed the items with greatest need were: Teaching students to think critically and creatively; motivating students to learn; managing student/classroom discipline; and teaching students with individualized education plans. Participants indicated that they had no professional development needs related to conducting parent/teacher conferences and conducting an adult program.

Statements and questions were organized in four areas established by Duncan et. al. (2006): FFA/Leadership Development/SAE, Technical Agriculture, Program Management, and Teaching and Learning. Alabama agriscience teachers identified competency areas with the highest MWDS as: FFA/Supervised Agricultural/Leadership Development (MWDS = 3.04), Technical Agriculture (MWDS = 2.48), Program Management (MWDS = 2.17), and Teaching and Learning (MWDS = 2.00). Specific items with the content area of FFA, Leadership Development, and SAE were preparing SAE proficiency award applications (MWDS = 4.41), developing SAE opportunities for students (MWDS = 4.23), and conducting activities which support the National Chapter Award. Participants identified items of greatest need in Technical Agriculture as integrating current advances in agriculture technology into the curriculum (MWDS = 4.74), teaching skills and concepts in aquaculture (MWDS = 3.65), and teachings skills and concepts in unmanned aerial vehicles and system (MWDS = 3.37). Areas of specific need within the content area of Program Management included evaluating the local program (MWDS = 3.62), incorporating electronic record book programs such as AET (MWDS = 3.51), and CTE directors having a strong understanding of the BIC process (MWDS = 2.79). Participants identified teaching students to think critically and creatively (MWDS = 4.69), motivating students to learn (MWDS = 4.19), and managing student/classroom discipline (MWDS = 2.72) as specific needs in the content area of Teaching and Learning.
### Table 5

**Teaching and Learning Need by MWDS**

<table>
<thead>
<tr>
<th>Content Areas</th>
<th>MI[^a]</th>
<th>MC[^b]</th>
<th>MWDS[^c]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teaching and Learning</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching students to think critically and creatively</td>
<td>4.69</td>
<td>3.69</td>
<td>4.69</td>
</tr>
<tr>
<td>Motivating students to learn</td>
<td>4.71</td>
<td>3.82</td>
<td>4.19</td>
</tr>
<tr>
<td>Managing student/classroom discipline</td>
<td>4.71</td>
<td>4.13</td>
<td>2.72</td>
</tr>
<tr>
<td>Teaching students with individualized education plans</td>
<td>4.38</td>
<td>3.76</td>
<td>2.72</td>
</tr>
<tr>
<td>Incorporating varied teaching models for student instruction</td>
<td>4.24</td>
<td>3.64</td>
<td>2.55</td>
</tr>
<tr>
<td>Developing inquiry-based learning opportunities</td>
<td>4.18</td>
<td>3.64</td>
<td>2.23</td>
</tr>
<tr>
<td>Developing inquiry-based learning opportunities</td>
<td>4.07</td>
<td>3.58</td>
<td>1.99</td>
</tr>
<tr>
<td>Organizing and supervising teaching laboratories</td>
<td>4.42</td>
<td>4.00</td>
<td>1.87</td>
</tr>
<tr>
<td>Developing performance-based assessment instruments</td>
<td>4.02</td>
<td>3.60</td>
<td>1.70</td>
</tr>
<tr>
<td>Assessing student performance using formative and summative assessments</td>
<td>3.93</td>
<td>3.64</td>
<td>1.14</td>
</tr>
<tr>
<td>Planning and conducting student field trips</td>
<td>4.40</td>
<td>4.20</td>
<td>0.88</td>
</tr>
<tr>
<td>Conducting parent/teacher conferences</td>
<td>3.87</td>
<td>3.87</td>
<td>0.00</td>
</tr>
<tr>
<td>Conducting an adult program</td>
<td>3.18</td>
<td>3.20</td>
<td>-0.08</td>
</tr>
</tbody>
</table>

[^a]: Importance (1=Not important, 2=Of little Importance, 3=Somewhat important, 4=Important, 5=Very Important)
[^b]: Competence (1=Not competent, 2=Little competence, 3=Somewhat competent, 4=Competent, 5=Very competence)
[^c]: Mean Weighted Discrepancy Score (True limits range from -20 to 20)

Alabama agriscience teacher’s professional development needs by content areas were consistent across age, years teaching, region location, and how certified. Professional development needs differed by gender. Technical agriculture needs differed by gender t(41) = 2.03, p < .05; Females (MWDS = 4.21) tended to have higher needs than male (MWDS = 2.17). There were no significant differences by: FFA, leadership development, and SAE and gender t(41) = 1.03, p > .05; program management and gender t(41) = .67, p > .05; and teaching and learning and gender t(41) = .79, p > .05.

There were no significant differences by: FFA, leadership development, and SAE and age t(41) = 1.24, p > .05; technical agriculture and age t(41) = .87, p > .05; program management and age t(41) = .25, p > .05; and teaching and learning and age t(41) = .01, p > .05. There were no significant differences by: FFA, leadership development, and SAE and years teaching t(41) = .25, p > .05; technical agriculture and years teaching t(41) = 1.31, p > .05; program management and years teaching t(41) = 1.57, p > .05; and teaching and learning and years teaching t(41) = .51, p > .05. There were no significant differences by: FFA, leadership development, and SAE and how certified t(41) = .92, p > .05; technical agriculture and how certified t(41) = 1.87, p > .05; program management and how certified t(41) = 1.09, p > .05; and teaching and learning and how certified t(41) = 1.54, p > .05. There were no significant differences by: FFA, leadership development, and SAE and region F(2, 41) = .46, p > .05; technical agriculture and region F(1, 41) = 2.91, p > .05;
program management and region $F(2, 41) = .03, p > .05$; and teaching and learning and region $F(2, 41) = .06, p > .05$.

Conclusions, Implications, and Recommendations

The purpose of this study was to identify the professional development needs of secondary agriscience teachers in Alabama and their level of competence and importance related to statements and questions regarding professional development needs. Statements and questions were organized within four thematic units: FFA/Leadership Development/SAE, Technical Agriculture, Program Management, and Teaching and Learning. Alabama agriscience teachers identified competency areas with the highest MWDS as: FFA/Supervised Agricultural/Leadership Development (MWDS = 3.04), Technical Agriculture (MWDS = 2.48), Program Management (MWDS = 2.17), and Teaching and Learning (MWDS = 2.00). Specific items with the content area of FFA, Leadership Development, and SAE were preparing SAE proficiency award applications (MWDS = 4.41), developing SAE opportunities for students (MWDS = 4.23), and conducting activities which support the National Chapter Award. Participants identified items of greatest need in Technical Agriculture as integrating current advances in agriculture technology into the curriculum (MWDS = 4.74), teaching skills and concepts in aquaculture (MWDS = 3.65), and teaching skills and concepts in unmanned aerial vehicles and system (MWDS = 3.37). Areas of specific need within the content area of Program Management included evaluating the local program (MWDS = 3.62), incorporating electronic record book programs such as AET (MWDS = 3.51), and CTE directors having a strong understanding of the BIC process (MWDS = 2.79). Participants identified teaching students to think critically and creatively (MWDS = 4.69), motivating student to learn (MWDS = 4.19), and managing student/classroom discipline (MWDS = 2.72) as specific needs in the content area of Teaching and Learning. These findings support the need for professional development needs in Alabama and may indicate a national trend for further training may be present. Duncan, Ricketts, et al., (2006) found similar trends in the professional development needs of agriscience teachers in Alabama. Alabama agriscience teachers indicated the need for professional development based on critical thinking and creativity strategies for classroom and student success as a component of this needs assessment study. Critical thinking, or problem solving has been identified as a best practice in agriculture education because of the numerous proven benefits and supported by existing research in agriculture education. The role of critical thinking instruction allows the agriculture educator to serve as facilitator in group problem solving approaches. Lamm, Shoulders, et al., (2012) recommended that students should work within and among groups. While this approach is ideal, the analysis of this study indicated it is of vital importance for teacher development in Alabama. The results of this study indicate a number of areas which should be addressed through professional development opportunities. Teachers indicated Supervised Agriculture Experience opportunities, agriculture technology, computerized record books, and student motivation as potential areas of focused professional development.

The implications of this study indicate knowledge gaps in the skill sets of practicing teachers, specifically SAE instruction and critical thinking skills. To address these gaps, on-going and focused professional development should be provided to the agriscience teachers of Alabama. As a result of meeting these needs for practicing teachers, the outcome of these findings should diminish the SAE and critical thinking development needs associated in these findings thereby enhancing the overall effectiveness of teachers in the classroom. Specific recommendations apply for Auburn Agriscience Education and state staff to articulate these findings through sponsored professional development and required coursework for teacher certification and continuing education development credits for practicing teachers. This study supported Borich’s Needs Assessment Theory (1980) by asking teachers to identify areas of competency and importance and defining their needs for continuing education. Professional development needs for Alabama
agriscience teachers by assessing their current competence versus the importance of the particular competence in the performance of their job. With one exception, professional development needs were consistent across all personal characteristics of Alabama agriscience teachers.

Further research should be conducted among states to determine if the results of this study are local or shared in different geographic regions. Similarities and differences exist between states and regions in regards to the FFA, instruction, and training. A comparative study with multiple states would provide stronger validation for national organizations tasked with professional development opportunities at national and regional conferences. Through the analysis of this study and similar investigations, primary trends can be observed, yet, no formal investigation has been initiated. These recommendations will provide insight and focus for teacher development in Alabama for the improvement of agricultural education.

References


Influence of Social Support on Teacher Self-Efficacy in Novice Agricultural Education Teachers

Debra S. Korte1 & Jon C. Simonsen2

Abstract

Teacher self-efficacy impacts student achievement, job satisfaction, and teacher retention. Although the benefits of social support have been extensively studied in medicine and psychology, limited research has been completed in education to evaluate the ways in which social support contribute toward teacher self-efficacy. The purpose of this descriptive-relational study was to determine the influence of sources and types of support on teacher self-efficacy in novice agricultural education teachers. The target population was novice teachers of agriculture from Illinois (n = 192) and Indiana (n = 104). Teachers’ perceptions of support from three non-school sources and six school sources of support within three social support constructs were used to predict the contribution of social support on teacher self-efficacy. Novice agricultural education teachers’ perceptions of support from school sources – predominantly students and community – explained 27.1% of the variance in teacher self-efficacy. The results from this study imply the support (i.e., verbal or social persuasion) novice agricultural education teachers perceive from students and community are the most significant predictors of teacher self-efficacy. These findings advocate the need for novice teachers of agriculture to develop quality relationships with students and community members to increase teacher self-efficacy, thus potentially improving teacher retention.

Keywords: teacher self-efficacy; social support; teacher retention; novice teachers; students; community

Introduction/Literature Review

Novice teachers, those with less than five years in the profession, experience a multitude of psychological and physiological challenges in their chosen career as an educator. Literature confirms that novice teachers display symptoms associated with culture shock (Caspersen & Raan, 2013; Langley, Martin, & Kitchel, 2014), a major life event or transition (Caspersen & Raan, 2013; Heaney & Israel, 2008; Zimet, Dahlem, Zimet, & Farley, 1988), and lack of social connectedness as they familiarize themselves in a new community (Caspersen & Raan, 2013; Langley et al., 2014). Moreover, lofty expectations from parents, students, and members of the community, combined with self-inflicted social comparisons with other teachers and FFA advisors, influence job satisfaction and career longevity for novice teachers of agriculture (Kitchel, Smith, Henry, Robinson, Lawver, Park, & Schell, 2012). These stressors, in addition to perceived lack of control over external work and personal circumstances, along with feelings of isolation in the school environment (Buchanan, Prescott, Schuck, Aubusson, & Burke, 2013; Burke, Aubusson,
Schuck, Buchanan, & Prescott, 2015; Thoits, 1995; Wethington & Kessler, 1986), increase the likelihood of psychological disorders (e.g., emotional strain, anxiety, and depression) and use of negative behavioral coping responses (e.g., smoking, drug or alcohol use); subsequently, these health-debilitating behaviors increase the risk of physiological illnesses (e.g., chronic stress and sleep disorders) (Cobb, 1976; Cohen, 2004). As a result, the challenges that novice teachers face, in combination with the psychological and physiological symptoms they experience, may entice them to pursue a career outside of the classroom.

Teacher attrition – teachers leaving the profession of teaching – has increased at an alarming rate in the United States over the last two decades. Ingersoll (2012) estimated that between 40% and 50% of teachers leave within the first five years of entry into teaching. For novice teachers, this is an increase of approximately one-third since 1990. Teacher attrition affects school districts by inflicting financial costs and negative impacts on student achievement (Barnes, Crowe, & Schaefer, 2007). Furthermore, the decline in teachers’ commitment to the profession has contributed toward shortages of qualified teachers in many disciplines, including agricultural education (Kantrovich, 2010).

As reported in the 2016 Executive Summary from the National Agricultural Education Supply and Demand Study, more than half of the states reporting lost secondary agriculture programs or agricultural educator teaching positions since 2011. Although retirement was the most frequently reported reason for leaving (28.0%), a combined 44.5% of respondents who left the profession of teaching (a) pursued employment in production agriculture, business or industry, or non-formal education; (b) transitioned to a school administrator position or were employed in another educational area; or (c) chose to stay at home in a parent or caregiver role (Smith, Lawver, & Foster, 2017). Due to the scarce supply of agricultural education teachers, many open positions were filled by alternatively licensed teachers. In the Midwest alone, nearly one out of every eight new agriculture teachers hired in 2015 were non-licensed educators (Foster, Smith, & Thompson, 2016).

Researchers in education, business, and psychology have studied teacher retention, employee turnover, and career commitment for decades. Career commitment is defined as an individual’s attitude, motivation, and psychological attachment towards a profession or vocation (Blau, 1985, 1988; Goulet & Singh, 2002; Knobloch & Whittington, 2003; The Project on the Next Generation of Teachers, 2006). In addition to salary, benefits, and opportunities for advancement – all of which may influence career commitment – researchers also determined employees’ feelings of support, particularly from supervisors and colleagues, positively influenced career commitment and job satisfaction (Blau, 1988; Jensen, Patel, & Messersmith, 2013; Stockard & Lehman, 2004).

As defined by Cobb (1976), support is the belief that one is cared for and loved, wherein the feelings of support contribute to personal appraisals of esteem and value. Furthermore, individuals who possess the psychological awareness of support have an enhanced sense of worth and belonging. The self-assessment of support is often expressed within a larger social network of people who have a mutual obligation toward the success of an organization. In the context of education, teachers who had supportive administrators and colleagues, who also felt students and parents respected them, were more likely to stay in their current school and continue in the profession of teaching (University of Chicago Urban Education Institute, 2009).

Whereas perceived support is a predominant reason people stay committed to a career, stressors such as workload, job demands, and lack of autonomy contribute toward employees’ decision to leave a career. These variables, in addition to collective efficacy (Caspersen & Raanen, 2013; Klassen & Chiu, 2010; Knobloch & Whittington, 2002), supervisor leadership (Massenberg,
Spurk, & Kauffeld, 2015; Tickle, Chang, & Kim, 2010), and working conditions (Chou, 2015; Gersten, Gillman, Mornant, & Billingsley, 1995; Hancock & Scherff, 2010) impact self-efficacy and its subsequent relationship to career commitment.

Self-efficacy is a belief in one’s ability to be successful in completing a given task or job (Bandura, 1977, 1986, 1997). The perception of self-efficacy is a psychological state of mind which encompasses characteristics from the locus of control and social cognitive theories. An individual’s perception of control depends on their interpretation of themselves as either a contributor to their life circumstances, or merely an outcome of external controls (Bandura, 2009). Moreover, perceptions of control influence self-efficacy (Rotter, 1966), self-efficacy is manipulated by verbal persuasion (i.e., support), and perceptions of self-efficacy contribute to career commitment. Consequently, employees who feel supported in the workplace possess greater levels of self-efficacy and increased commitment to their job. Conversely, employees in high stress, low support environments are likely to have low levels of self-efficacy and are more apt to leave their place of employment (Chan, 2002).

Specific to education, low teacher self-efficacy is a primary reason teachers choose to leave education (Brown, Lee, & Collins, 2014; Knobloch & Whittington, 2002; McKim & Velez, 2015; Swan, Wolf, & Cano, 2011; Tschannen-Moran & Woolfolk Hoy, 2007). Teacher self-efficacy is defined by Tschannen-Moran & Woolfolk Hoy (2001) as the belief one is capable of bringing about desired outcomes of student engagement and learning, regardless of how difficult or unmotivated the students may be. Moreover, teacher self-efficacy has been linked to career commitment and retention, teacher quality, student achievement, and job satisfaction (Hancock & Scherff, 2010; Kelly & Northrup, 2015; Sorenson & McKim, 2014; Struyven & Vantournout, 2014). Thus, teachers who possess high levels of self-efficacy are more likely to remain in the profession.

Novice teachers are most likely to experience the negative consequences of low self-efficacy. Novice teachers self-report their highest levels of teacher self-efficacy at the end of the student teaching, but their lowest teacher self-efficacy at the conclusion of their first year in the profession (Wenner, 2001; Woolfolk Hoy, 2000). Researchers postulate this may be either a result of the gap between novice teachers’ standards which they set for themselves and their actual perceived performance (i.e., reality shock) (Corbell, Reiman, & Nietfeld, 2008; Kelly & Northrup, 2015), or the removal of accessible support they received from their cooperating teacher and university supervisor during the student teaching experience (Knobloch & Whittington, 2002; Roberts, Harlin, & Ricketts, 2006; Stripling, Ricketts, Roberts, & Harlin, 2008). Novice teachers must perceive the availability of support to meet their psychological needs and develop self-efficacy in their abilities as an educator (Caspersen & Raaen, 2013; Chou, 2015; Heaney & Israel, 2008). As stated by Carroll (2005) in his report for the National Commission on Teaching and America's Future, "[Teachers] leave for many reasons, but lack of support is at the top of the list" (Carroll, 2005, p. 199).

Teachers, like many other professionals, need to feel supported in their efforts. Regardless of the profession, high levels of perceived support result in more efficacious feelings and an increased likelihood the individual will remain committed to his or her career. Unfortunately, education has not adopted the philosophies of the corporate world in respect to onboarding practices with new or early career employees and allocation of resources toward human capital development. “No other profession takes newly certified graduates, places them in the same situation as seasoned veterans, and gives them no organized support” (Maistre & Pare, 2010, p. 560). Even though novice teachers begin their careers with anticipation and enthusiasm, how can they be expected to thrive with little to no support? With the multitude of stressors faced in the critical early years of teaching, novice teachers must feel supported to succeed and remain in the profession.
Researchers who study organizational behavior determined employees’ perceptions of support from supervisors and colleagues predict self-efficacy and career commitment (Chou, 2015; Massenberg et al., 2015). Similarly in the world of education, support from administrative leadership (Buchanan et al., 2013; Tickle et al., 2010) and other teachers in the school (Darling-Hammond, 2005; Devos, Dupriez, & Paguay, 2012; Ingersoll, 2012; Kelly & Northrup, 2015) are predictors of teacher self-efficacy and career commitment. In addition to these shared sources of support, schools are unique to other workplace environments in that perceptions of support are also derived from students, parents of students (Beard, Hoy, & Hoy, 2010; Fantilli & McDougall, 2009; Struyven & Vanthournout, 2014), and the local community (Tschannen-Moran & Woolfolk Hoy, 2002). Moreover, personal sources of support also contribute toward self-efficacy beliefs and one’s motivation to stay committed to a career (Bataineh, 2009; Cornu, 2013; Dignam & West, 1988; Wethington & Kessler, 1986). The network of personal sources of support for teachers includes family (e.g., siblings, parents, children), friends outside of work, and a spouse or partner.

In an effort to build a support network to enhance career commitment and improve teacher self-efficacy, it is essential to identify the types of support that are most beneficial for novice teachers. Social support is categorized by House (1981) into four constructs – emotional, appraisal, informational, and instrumental. Emotional support includes feelings of concern, love, trust, and empathy. This form of support is demonstrated through the actions of listening and caring for others. Appraisal support involves the process of receiving affirmation and constructive feedback; subsequent psychological outcomes from appraisal support include social comparison and reflective evaluation. Informational support is acquired when a person receives advice or suggestions; often, this directive behavior is experienced when problems arise which need to be solved. Instrumental support is obtained in the form of tangible items. Examples of tangible items include money, gifts, and donations of time or resources (Heaney & Israel, 2008; House & Wells, 1978).

Conceptual Framework

The conceptual framework that served as the foundation for this study was derived from literature on social support (Cohen & Wills, 1985; House, 1981) and teacher self-efficacy (Bandura, 1997; Tschannen-Moran & Woolfolk Hoy, 2001). As shown in Figure 1, social support can either be perceived as available or received in the forms of emotional/appraisal support, informational support, or instrumental support (Cohen & Hoberman, 1983; Heaney & Israel, 2008; House, 1981; House & Wells, 1978). Support may come from school (i.e., work) sources – administrators, teachers, students, parents, or community (House & Wells, 1978; Knobloch & Whittington, 2002; Tschannen-Moran & Woolfolk Hoy, 2007) – or non-school (i.e., personal) sources – spouse or partner, family, or friends outside of work (Bataineh, 2009; Cornu, 2013; Fantilli & McDougall, 2009). Along with other variables, the support a novice teacher may receive or perceive as available impacts his or her perceived level of teacher self-efficacy (Tschannen-Moran & Woolfolk Hoy, 2001); teacher self-efficacy is a predictor of one’s psychological commitment to a career (Burke et al., 2015; DeAngelis, Wall, & Che, 2013; Devos et al., 2012; Maistre & Pare, 2010).
Novice teachers need a supportive environment to thrive in challenging conditions and combat stressors of personal and professional life. Researchers have determined clear connections between the perceptions of available social support and self-efficacy, and between self-efficacy and career commitment (Bandura, 2009; Chou, 2015; Collie, Schapka, & Perry, 2012; Darling-Hammond, 2005; DeAngelis et al., 2013; Hancock & Scherff, 2010; Ingersoll, 2012; Jones, Youngs, & Frank, 2013; Knobloch & Whittington, 2003; Struyven & Vanthournout, 2014). In consideration of the high attrition risks for novice teachers and the critical shortage of teachers of agriculture, the need exists to unpack the specific sources and types of support which characterize novice teachers’ support network. An enhanced understanding of novice teachers’ perceptions of support, in addition to its collective contribution toward teacher self-efficacy, may help sustain and motivate teachers through the challenging early years of their careers and reduce the likelihood of attrition in novice agricultural education teachers (Burke et al., 2015; DeAngelis et al., 2013; Swan et al., 2011).

**Purpose and Objectives**

This study addresses the American Association for Agricultural Education’s (AAAE) National Research Agenda Research Priority 3 as, “Sufficient Scientific and Professional Workforce that Addresses the Challenges of the 21st Century” (Roberts, Harder, & Brashears, 2016). Specifically, this priority poses the research question, “What methods, models, and practices are effective in recruiting agricultural leadership, education, and communication practitioners and supporting their success at all stages of their careers?” (Stripling & Ricketts, 2016, p. 31).

The purpose of this descriptive-relational study was to determine the degree of social support novice agricultural education teachers perceive from various sources and types of social support, along with the influence of perceived support on novice teacher self-efficacy. The following research objectives guided the study.

1. Determine the degree of support novice agricultural education teachers perceive as available from non-school sources (e.g., spouse or partner, family, friends) and school sources (e.g., administrators, teachers at school, teachers in FFA section or district, students, parents, community) of support.
2. Determine the types of social support (e.g., emotional/appraisal, informational, instrumental) which novice agricultural education teachers perceive as available.

3. Describe the perceived level of teacher self-efficacy in novice agricultural education teachers.

4. Describe the contribution of perceived support from non-school sources and school sources towards teacher self-efficacy in novice agricultural education teachers.

5. Describe the contribution of the types of social support toward teacher self-efficacy in novice agricultural education teachers.

Methods/Procedures

This quantitative inquiry employed descriptive and inferential methods to address the contributions of perceived support on teacher self-efficacy in novice agricultural education teachers. The target population was novice teachers of agriculture from Illinois (n = 192) and Indiana (n = 104) with five or fewer years of teaching experience during the 2016-2017 academic year. The population included teachers who (a) completed a university teacher preparation educator licensure program, or (b) who were teaching with an Illinois Educator License with Stipulations (ELS) endorsement or Indiana Proficiency Practitioner license (i.e., provisional or alternative certification). The names and email addresses for novice agricultural education teachers in Illinois were obtained from the Facilitating Coordination for Agricultural Education (FCAE) Program Advisors and the Illinois Association of Vocational Agriculture Teachers (IAVAT) public online directory (IAVAT Directory, 2016). The names for novice agricultural education teachers in Indiana were obtained from faculty at Purdue University. The email addresses for teachers were obtained through the Indiana Association of Agricultural Educators (IAAE) public online directory (IAAE Directory, 2016).

Researchers collected 119 responses from agricultural education teachers with five or fewer years of teaching experience. Teachers’ perceptions of support from three non-school sources (e.g., spouse or partner, family, friends) and six school sources (e.g., administrators, teachers at school, teachers in FFA section or district, students, parents, community) of support within three support constructs (e.g., emotional/appraisal, informational, instrumental) were used to predict the contribution of social support on teacher self-efficacy. Following IRB guidelines, consent approval was obtained prior to data collection. The online survey instrument included three sections, in addition to a demographic section that collected relevant personal and work-related characteristics. The three primary sections of the online instrument were the Social Support Scale (developed by the researchers); the Teachers’ Sense of Efficacy Scale (short form) (Tschannen-Moran & Woolfolk Hoy, 2001); and Career Commitment (Hancock and Scherff, 2010).

Social Support Scale

Ten survey items were developed by the researchers to determine perceived support from non-school sources and school sources. The initial draft of the survey instrument included three non-school sources of support and nine school sources of support that encompassed the work and personal life responsibilities experienced by a teacher (Cohen & Wills, 1985; Smith, Corkery, Buckley, & Calvert, 2013; Tschannen-Moran & Woolfolk Hoy, 2002; Tschannen-Moran & Woolfolk Hoy, 2007). Moreover, an agriculture teacher’s responsibilities associated with his or her role as an FFA advisor (Terry & Briers, 2010) warrants the assessment of perceived support from a greater variety of non-school (i.e., personal) and school sources of support. For the purpose of this study, the three non-school sources of support were: spouse or partner, family, and friends outside of work. The nine school sources included in the pilot test were: building administrator, district administrator, school board, teachers at the school, teachers in the FFA section or district, students in agriculture classes, students in FFA, parents of students, and community.
Survey items were primarily developed from research findings of Tschannen-Moran and Woolfolk Hoy (2002, 2007) and House (1981), but also influenced by the Medical Outcomes Study: Social Support Survey (MOS-SSS) (Sherbourne & Stewart, 1991), the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al., 1988), the Interpersonal Support Evaluation List (ISEL) (Cohen & Hoberman, 1983), and The Social Provisions Scale (SPS) (Russell & Cutruna, 1984). Modifications were made to the survey items to assess perceptions of support within a school climate and within the context of agricultural education. A 9-point response scale was used to determine the degree of perceived support received from various sources and in differing forms (i.e., types) of social support. Anchors for the degree of perceived support were 1 = never, 3 = rarely, 5 = sometimes, 7 = often, and 9 = always. The use of a 9-point response scale with anchors on alternating points is consistent with Tschannen-Moran and Woolfolk Hoy’s (2002, 2007) research on teachers’ perceived quality of support (i.e., verbal persuasion) received from administration, colleagues, parents, and community.

A panel of experts, consisting of four faculty from two universities who specialize in agricultural education and agricultural leadership education disciplines, reviewed the instrument for face and content validity. Additionally, the instrument was pilot-tested with novice agriculture education teachers from two states not utilized in this study. The representative sample consisted of teachers with 5 of fewer years of teaching experience. This purposive sample was chosen for the pilot test in an effort to represent a sample of novice teachers from states similar to those teachers from states in the actual research frame. Three emails were sent to selected novice teachers of agriculture during a two-week time span; out of 48 teachers invited to participate, 27 teachers completed the questionnaire, resulting in a pilot test response rate of 56.3%. Additionally, 14 partially completed questionnaires indicated a potential for respondent fatigue.

The pilot test survey instrument which assessed perceived support corresponded to the four social support constructs, identified by House (1981) as emotional support, appraisal support, informational support, and instrumental support. In the pilot test, 3-4 survey items were asked per support category to assess each construct. To reduce the potential for respondent fatigue and consistent with previous research findings, the emotional and appraisal support constructs were collapsed into one construct identified as emotional/appraisal support (Cohen & Hoberman, 1983; House, 1981; House & Wells, 1978). An example question in the emotional/appraisal support construct was, “How often do the following people show empathy (i.e., shared understanding) for your needs?” An example question in the informational support construct was, “How often do the following people provide helpful suggestions related to your profession as an agricultural education teacher?” An example question in the instrumental support construct was, “How often can these people be relied upon to provide resources (e.g., money, time, equipment) which help you succeed as an agricultural education teacher?” Participants were not informed of the specific social support construct which corresponded to each survey item. Moreover, survey items for the social support constructs were randomized to reduce respondents’ tendency to perceive questions measuring the same construct as redundant.

From the pilot test results, Cronbach’s alpha estimates of internal consistency were calculated for reliability of the (a) ten individual items used to assess the social support constructs; (b) three social support constructs of emotional/appraisal, informational, and instrumental support; and (c) the twelve potential sources of non-school and school support. Reliability estimates from the pilot test reflected “excellent” internal consistency (Cronbach, 1951; Nunnally, 1978) for the emotional/appraisal construct (α = .96), informational construct (α = .92), and the instrumental construct (α = .95). In addition to the social support constructs, Cronbach’s alpha reliability estimates were calculated for the three non-school and nine school sources of support. Results from the calculations, in addition to literature findings and a concern of respondent fatigue, prompted
the decision to modify the survey instrument. Cronbach’s Alpha reliability estimates for Building Administrator \( (\alpha = .96) \), District Administrator \( (\alpha = .95) \), and School Board \( (\alpha = .92) \) resulted in values exceeding .90. Values higher than .90 imply redundancy or measurement of the same construct (Cronbach, 1951; Nunnally, 1978). Thus, the decision was made to combine the three measures for Building Administrator, District Administrator, and School Board into one item for Administrator(s) \( (\alpha = .95) \). Furthermore, the two items measuring perceived support from students resulted in values of \( \alpha = .90 \) for Students in your agriculture classes and \( \alpha = .89 \) for Students in FFA. However, when reliability estimates were calculated for combined Student support, the results produced a more desirable coefficient of \( \alpha = .94 \). Thus, the researchers chose to combine the two student measures into one item for Student support.

**Teachers’ Sense of Efficacy Scale**

The Teachers’ Sense of Efficacy Scale (short form), developed by Tschannen-Moran and Woolfolk Hoy (2001), was used to measure teacher self-efficacy. This survey instrument has been widely described as the superior measurement to assess teacher self-efficacy, regardless of personal or school characteristics (Duffin, French, & Patrick, 2012; Hoy & Spero, 2005; Klassen & Chiu, 2010). The Teachers’ Sense of Efficacy Scale (short form) includes twelve items which ask participants to evaluate their ability to influence or control factors related to instructional practices, classroom management, and student engagement. Anchors for the 9-point Likert-type scale assessing teacher self-efficacy were 1 = nothing, 3 = very little, 5 = some influence, 7 = quite a bit, and 9 = a great deal. This commercially available survey instrument has been assessed for validity and reliability. The published reliabilities for the three constructs (e.g., instructional practices, student engagement, and classroom management) of the Teachers’ Sense of Efficacy Scale (short form) range from .81 to .90.

**Career Commitment**

A one-item measure was used to assess career commitment. The survey item was modified from a question used by Hancock and Scherff (2010) wherein researchers used a dependent variable to measure attrition risk. A single-item measure was deemed sufficient to measure this variable due to the narrow, unambiguous nature of this psychological construct (Wanous, Reichers, & Hudy, 1997). The prompt used in the survey instrument asked participants to express their level of agreement with the following statement, “Thinking about your future career plans, to what extent do you agree or disagree with the following statement: I plan to continue teaching agriculture in a high school classroom for the next 5 years.” The single-item question asked participants to choose from one of seven responses. The seven possible options were 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neither agree nor disagree, 5 = somewhat agree, 6 = agree, and 7 = strongly agree. A prefer not to respond option and text box for comments were also provided.

**Data Collection**

The questionnaire was administered online via Qualtrics data collection service (www.qualtrics.com) in November 2016. Researchers chose to distribute the questionnaire in November to attempt to capture novice teachers’ perceptions of support during the Disillusionment phase of teaching (Moir, 1999). Following recommended guidelines from Dillman, Smyth, and Christian (2009) and in an effort to increase response rates, participants received a pre-notification email to inform them of the purpose of the study, an invitation email that included a link to the questionnaire, two follow-up reminders, and a final notification email. Thank you emails were sent
to all participants who completed the questionnaire. Of the 296 invited teachers, 119 usable responses were attained, resulting in a 40.20% response rate.

To address non-response error, the researchers used two methods recommended by Linder, Murphy, and Briers (2001). No statistically significant differences were found between early and late respondents for 12 of the 14 items assessed in the survey instrument using the Comparison of Early to Late Respondents method. To address concerns for the two remaining items (future career plans and non-school sources of support), the researcher used the “Days to Respond” as a Regression Variable method. After analyzing the results from the regression, the researcher determined the non-school sources of support variable to be a valid measurement, generalizable to the target population. The future career plans variable was not directly related to the research objectives of this study; therefore, the researcher chose to proceed with data analysis, but exercised some degree of caution when evaluating implications of the future career plans variable.

Data Analysis

Data were analyzed using means, standard deviations, and range for objectives 1-2. Means, standard deviations, and reliabilities were calculated for objective 3. For objectives 4-5, hierarchical forced entry multiple linear regression was used to predict the contribution of perceived support from various sources and types of support on novice teacher self-efficacy. Researchers reported unstandardized beta, standard error beta, standardized beta coefficient, significance level, adjusted $R^2$, $F$ value, change in $F$ value, degrees of freedom, and change in $R^2$.

Findings/Results

The majority of teachers ($n = 119$) were female (68.9%) with three or fewer years of teaching experience (79.0%) who completed a traditional teacher licensure program (69.7%). Most of the teachers were from Illinois (74.8%), while the remaining 25.2% were from Indiana. The respondents represented the age and experience level of the population of agricultural education teachers in the two states. The majority of respondents (63.9%) selected strongly agree or agree when prompted to respond to a statement regarding future plans to teach (i.e., career commitment) in the next five years.

The first research objective was to determine the degree of support novice teachers of agriculture perceived as available from three non-school sources and six school sources of support. As shown in Table 1, novice teachers perceived the greatest degree of non-school support from family ($M = 6.69, SD = 1.40$), while the greatest degree of school support was from teachers in their FFA section or district ($M = 5.94, SD = 1.66$). Conversely, the least degree of support within the two constructs of non-school and school support was perceived from spouse or partner ($M = 4.97, SD = 1.58$) and parents of students ($M = 4.86, SD = 1.54$), respectively. It should be noted that teachers who indicated they were not in a relationship with a spouse or partner were coded as 0 = N/A. When evaluating results for the overall mean of the three non-school sources of support and the six school sources of support, teachers perceived more support from non-school sources ($M = 5.83, SD = 1.55$) as compared to school sources ($M = 5.39, SD = 1.24$) of support. However, both fell within the parameters of being supported sometimes.
Table 1

Respondents’ Perceived Levels of Support from Non-School and School Sources (n = 119)

<table>
<thead>
<tr>
<th>Sources of Support</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-School Sources of Support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spouse or partner a</td>
<td>4.97</td>
<td>1.58</td>
<td>0-9</td>
</tr>
<tr>
<td>Family</td>
<td>6.69</td>
<td>1.40</td>
<td>1-9</td>
</tr>
<tr>
<td>Friends outside of work</td>
<td>5.84</td>
<td>1.54</td>
<td>1-9</td>
</tr>
<tr>
<td>School Sources of Support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrator(s)</td>
<td>5.65</td>
<td>1.90</td>
<td>1-9</td>
</tr>
<tr>
<td>Teachers at your school</td>
<td>5.45</td>
<td>1.68</td>
<td>1-9</td>
</tr>
<tr>
<td>Teachers in your FFA section/district</td>
<td>5.94</td>
<td>1.66</td>
<td>1-9</td>
</tr>
<tr>
<td>Students</td>
<td>5.22</td>
<td>1.39</td>
<td>1-9</td>
</tr>
<tr>
<td>Parents of your students</td>
<td>4.86</td>
<td>1.54</td>
<td>1-9</td>
</tr>
<tr>
<td>Community where you teach</td>
<td>5.24</td>
<td>1.55</td>
<td>1-9</td>
</tr>
<tr>
<td>Non-School Sources of Support</td>
<td>5.83</td>
<td>1.55</td>
<td>0-9</td>
</tr>
<tr>
<td>School Sources of Support</td>
<td>5.39</td>
<td>1.24</td>
<td>1-9</td>
</tr>
</tbody>
</table>

Note. a Respondents who selected N/A for the spouse or partner variable were coded 0 = N/A. Measured on a scale from 1 (never) to 9 (always) (Tschannen-Moran & Woolfolk Hoy, 2002; Tschannen-Moran & Woolfolk Hoy, 2007).

With research objective two, researchers sought to determine the types of support teachers perceived as available. Ten items were used in the survey instrument to evaluate teachers’ perceptions of support within three separate constructs. Four survey items were used for the emotional/appraisal support construct, three survey items were used for the informational support construct, and three items were used for the instrumental support construct. As shown in Table 2, novice agricultural education teachers perceived each construct of support as sometimes available. While the emotional/appraisal support ($M = 5.84$, $SD = 1.22$) was perceived as the most available type of social support, respondents’ ratings for informational support ($M = 5.60$, $SD = 1.16$) and instrumental support ($M = 5.61$, $SD = 1.19$) had similar mean results. Respondents’ perceptions of each construct fell within the parameter of sometimes available.
Table 2

Respondents’ Perceived Levels of Varying Types of Support (n = 119)

<table>
<thead>
<tr>
<th>Types of Support</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional / Appraisal Support</td>
<td>5.84</td>
<td>1.22</td>
<td>0-9</td>
</tr>
<tr>
<td>Informational Support</td>
<td>5.60</td>
<td>1.16</td>
<td>0-9</td>
</tr>
<tr>
<td>Instrumental Support</td>
<td>5.61</td>
<td>1.19</td>
<td>0-9</td>
</tr>
</tbody>
</table>


The third objective was to describe the perceived level of teacher self-efficacy in novice agricultural education teachers. Consistent with reporting methods used by Tschannen-Moran and Woolfolk Hoy (2001), the authors reported mean, standard deviation, and reliability (α) for the three constructs of teacher self-efficacy, in addition to a score for the overall teacher self-efficacy. As shown in Table 3, novice agricultural education teachers indicated the greatest degree of teacher self-efficacy in the area of instructional practices (M = 6.84, SD = 1.12), while the least degree of teacher self-efficacy was in the area of student engagement (M = 6.13, SD = 1.10). Overall, the mean result for teacher self-efficacy (M = 6.57, SD = 0.96) indicated teachers perceived quite a bit of control in their efficacious beliefs for managing a classroom, engaging students, and using instructional practices.

Table 3

Respondents’ Perceived Levels of Teacher Self-Efficacy (n = 119)

<table>
<thead>
<tr>
<th>Construct</th>
<th>M</th>
<th>SD</th>
<th>Alpha (α)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom management</td>
<td>6.75</td>
<td>1.17</td>
<td>.88</td>
</tr>
<tr>
<td>Student engagement</td>
<td>6.13</td>
<td>1.10</td>
<td>.82</td>
</tr>
<tr>
<td>Instructional practices</td>
<td>6.84</td>
<td>1.12</td>
<td>.86</td>
</tr>
<tr>
<td>Overall teacher self-efficacy</td>
<td>6.57</td>
<td>0.96</td>
<td>.91</td>
</tr>
</tbody>
</table>

Note. Measured on a scale from 1 (nothing) to 9 (a great deal) (Tschannen-Moran & Woolfolk Hoy, 2001).

The fourth objective was used to describe the contribution of perceived support from non-school sources and school sources toward teacher self-efficacy in novice agricultural education teachers. The outcome variable for the regression was the overall mean of teacher self-efficacy. Researchers chose to use the hierarchical forced entry method for multiple linear regression due to (a) the unknown predictive power of the covariates for sources of support used in this study, and (b) to uncover the predictive power of the covariates for demographic characteristics and career commitment. In an effort to enhance the predictive power of the regression models while also recognizing the potential influence of other variables outside the administrative controls of the study, researchers entered the covariates from least to most administratively controllable. As a result, Step 1 of the regression included the total years of teaching experience. The subsequent regression steps included three independent (i.e., predictor) variables for non-school sources of support (e.g., spouse or partner, family, friends) (Step 2), and the six independent variables for school sources of support
(e.g., administrators, teachers at school, teachers in FFA section or district, students, parents, community) (Step 3).

Given the sample size of 119, post-hoc statistical power was calculated for the regression. Social science conventions accept 80% observed power for significance for the addition of a set of independent variables in the overall hierarchical model. Using the effect size of .27 with a probability level of $p < .05$, the observed power for the post-hoc statistical analysis for the addition of the school sources of support covariates resulted in a statistical power that exceeded 0.99. This result indicates less than a 1% chance of a Type II error. Thus, researchers proceeded with analysis with the understanding that the regression may not have the statistical power to draw conclusions, but the sample ($n = 119$) was sufficient for exploratory investigation (Pearson, 2010).

As shown in Table 4, Model 3 of the regression was significant, $F = 5.90(6, 108, p < .05)$. When controlling for all other variables, respondents’ total years of teaching contributed 4.0% ($\text{adjusted } R^2 = .04$) of the variance for teacher self-efficacy, while school sources of support contributed 27.1% ($\text{adjusted } R^2 = .27$) of the variance for teacher self-efficacy. The researchers determined differences in perceived support from school sources explained a significant ($p < .05$) proportion of variance in teacher self-efficacy in novice agricultural education teachers. Furthermore, individual assessment of Model 3 revealed four statistically significant ($p < .05$) covariates for teacher self-efficacy: total years of teaching ($p = .00$), perceived support from family ($p = .05$), students ($p = .00$) and community ($p = .01$). Furthermore, novice teachers’ perception of support from students ($\beta = 0.45$) was nearly twice as predictive as total years of teaching ($\beta = 0.27$). Additionally, perceived support from community ($\beta = 0.34$) was more predictive of teacher self-efficacy than total years of teaching. Of notable interest is the negative impact of perceived support from family on teacher self-efficacy. As such, the positive contribution of total years of teaching ($\beta = 0.27$) toward teachers’ self-efficacy beliefs was nearly equal to the negative contribution of perceived support from family ($\beta = -0.26$).
Table 4

Forced Entry Multiple Linear Regression of Respondents’ Teacher Self-efficacy using Selected Demographic Characteristics and Perceptions of Support from School and Non-school Sources (n = 119)

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th></th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
<th></th>
<th>Model 3</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE B</td>
<td>β</td>
<td>p*</td>
<td>B</td>
<td>SE B</td>
<td>β</td>
<td>p*</td>
<td>B</td>
<td>SE B</td>
<td>β</td>
</tr>
<tr>
<td>(Constant)</td>
<td>6.25</td>
<td>.16</td>
<td>.00</td>
<td></td>
<td>5.68</td>
<td>.44</td>
<td>.00</td>
<td></td>
<td>4.74</td>
<td>.47</td>
<td>.00</td>
</tr>
<tr>
<td>Total years teaching</td>
<td>.12</td>
<td>.05</td>
<td>.22</td>
<td>.02</td>
<td>.15</td>
<td>.05</td>
<td>.28</td>
<td>.00</td>
<td>.14</td>
<td>.05</td>
<td>.27</td>
</tr>
<tr>
<td>Spouse or partner</td>
<td>-.01</td>
<td>.03</td>
<td>-.02</td>
<td>.81</td>
<td>-.02</td>
<td>.03</td>
<td>-.07</td>
<td>.42</td>
<td>-.18</td>
<td>.09</td>
<td>-.26</td>
</tr>
<tr>
<td>Family</td>
<td>-.13</td>
<td>.10</td>
<td>-.19</td>
<td>.19</td>
<td>-.18</td>
<td>.09</td>
<td>-.26</td>
<td>.05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friends outside work</td>
<td>.24</td>
<td>.09</td>
<td>.38</td>
<td>.01</td>
<td>.13</td>
<td>.08</td>
<td>.21</td>
<td>.12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrator(s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.10</td>
<td>.06</td>
<td>.19</td>
<td>.09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers at school</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.07</td>
<td>.07</td>
<td>-.13</td>
<td>.31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers in FFA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.04</td>
<td>.05</td>
<td>-.08</td>
<td>.42</td>
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<td>Students</td>
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<td>.09</td>
<td>.45</td>
<td>.00</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Parents of students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.13</td>
<td>.10</td>
<td>-.21</td>
<td>.17</td>
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<td>.08</td>
<td>.34</td>
<td>.01</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.04</td>
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<tr>
<td>$F$</td>
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<td>2.84</td>
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<tr>
<td>Δ$R^2$</td>
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<td>Δ$F$</td>
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<td>5.90</td>
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</tbody>
</table>

Note. The dependent variable for the models is the mean score of overall teacher self-efficacy. Independent variables for non-school sources of support were spouse or partner, family, and friends outside of work. Independent variables for school sources of support included administrator(s), teachers at school, teachers in FFA section or district, students, parents of students, and community.

*p < .05
For objective five, researchers sought to describe the contribution of the types of social support (e.g., emotional/appraisal, informational, and instrumental) toward teacher self-efficacy in novice agricultural education teachers. Researchers identified the outcome variable as the overall mean of teacher self-efficacy for the regression. The overall model, which included the three social support constructs, was significant, $F = 6.26(3,114, p < .05)$, explaining 15.4% ($\text{adjusted } R^2 = .15$) of the variance in teacher self-efficacy. However, the three individual social support constructs (e.g., emotional/appraisal, informational, and instrumental support) were not statistically significant ($p < .05$) predictors of novice teacher self-efficacy.

As shown in Table 5, Model 2 of the regression was significant, $F = 6.26(3,114, p < .05)$, explaining 15.4% of the variance in teacher self-efficacy; however, the only statistically significant ($p < .05$) covariate in Model 2 was total years of teaching ($p = .00$). The three social support constructs of emotional/appraisal support, informational support, and instrumental support were not statistically significant ($p < .05$) predictors of novice teacher self-efficacy.

Table 5

Hierarchical Forced Entry Multiple Linear Regression of Respondents’ Teacher Self-Efficacy using Selected Demographic Characteristics and Perceptions of Various Types Social Support ($n = 119$)

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
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<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>SE $B$</td>
</tr>
<tr>
<td>(Constant)</td>
<td>6.25</td>
<td>.16</td>
</tr>
<tr>
<td>Total years teaching</td>
<td>.12</td>
<td>.05</td>
</tr>
<tr>
<td>Emotional/Appraisal</td>
<td>.18</td>
<td>.12</td>
</tr>
<tr>
<td>Informational</td>
<td>.18</td>
<td>.12</td>
</tr>
<tr>
<td>Instrumental</td>
<td>-.05</td>
<td>.13</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>$F$</td>
<td>5.89</td>
<td>(1,117)</td>
</tr>
<tr>
<td>$\Delta R^2$</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>$\Delta F$</td>
<td>5.89</td>
<td></td>
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</tbody>
</table>

*Note.* The dependent variable for Model 1 and Model 2 is the mean for overall teacher self-efficacy. Independent variables for the types of social support included emotional/appraisal support, informational support, and instrumental support. $^*p < .05$

**Discussion and Recommendations**

The purpose of the descriptive-relational study was to determine the degree of social support novice agricultural education teachers experience from various sources and types of social support, in addition to the influence of perceived support on novice teacher self-efficacy. Respondents were teachers of agriculture with five or fewer years of experience during the 2016-2017 academic year. Although this study included a representative sample of novice agricultural education teachers from Illinois and Indiana, the results and implications should not be generalized beyond the teachers in the geographic locations represented in this research. Caution should be used with interpreting the results due to the small sample and limited response rate (40.2%).
The intent of research objective one was to determine the degree of support novice agricultural education teachers perceived as available from non-school sources of support (e.g., spouse or partner, family, friends) and school sources of support (e.g., administrators, teachers at school, teachers in FFA section or district, students, parents, community). Based on the results, novice teachers of agriculture perceived more support from non-school (i.e., personal) sources of support than school sources of support. This finding is consistent with literature that confirms the psychological perception of support is often expressed in personal relationships that include feelings of companionship, value, love and belonging (Chou, 2015; Cobb, 1976), and are influenced by type, quality, and frequency of social interactions (Brouwers, Evers, & Tomic, 2001; DeAngelis et al., 2013). As such, novice teachers perceived the greatest degree of support from personal relationships with a spouse or partner, family, or friends.

Whereas novice teachers felt the greatest degree of support from non-school sources, their perceptions of support from friends outside of work and a spouse or partner were only perceived as sometimes available. Researchers postulate this impression of support from friends outside of work may be a consequence of geographic isolation for novice teachers who start their career in a new community (Buchanan et al., 2013; House, 2001). This finding reinforces the urgency for novice teachers of agriculture to quickly acclimate in the community where they are teaching and acquire personal, supportive relationships to combat the negative consequences of isolation. Additionally, novice teachers in this study indicated the least degree of support from a spouse or partner. With nearly half of the respondents (46.2%) indicating they were divorced, never married, or preferred not to respond, the low mean for this non-school source of support accurately reflects the absence of support from a spouse or partner in this sample. Further research is needed to compare perceptions of available support between teachers currently in a relationship with a spouse or partner to teachers not in a relationship. Additionally, research is necessary to determine if perceptions of support are different for novice male teachers versus novice female teachers.

Novice teachers in this study perceived the greatest degree of school support from teachers in their FFA section or district. Novice teachers’ perceptions of support from teachers in their FFA section or district may be attributed to (a) the appropriateness of a match between the support needed and the type of support provided; (b) the influence of mutual respect and social comparison on perceived support; or (c) the value of type, quality, and frequency of social interactions on perceptions of available support (Beard et al., 2010; Brouwers et al., 2001; Collie et al., 2012; Cornu, 2013; Darling-Hammond, 2005; Deangelis et al., 2013; Heaney & Israel, 2008; Kitchell et al., 2012; Nurullah, 2012; Wong, 2015). With respect to these essential characteristics of support, it is justifiable that novice teachers might perceive the greatest degree of support from teachers in their FFA section or district. Additionally, the results implied novice teachers’ perceived a greater degree of support from other agricultural education teachers rather than teachers and administrators in their school. Due to the nature of many agricultural education programs, teachers of agriculture may be expressing consequences of physical and professional isolation (Buchanan et al., 2013). The physical location of agricultural education classrooms is often separated from other classrooms, sometimes in a completely different building. Based on this premise, novice teachers may have infrequent interactions with administrators and colleagues, thus decreasing the degree of perceived support from these sources. To address the concern of isolation, administrators and other teachers in the school should actively seek opportunities to engage with novice teachers in a non-judgmental, supportive context.

Research objective two was used to clarify the types of social support which novice agricultural education teachers perceived as available. Researchers confirm that emotional and appraisal support is primarily acquired through intimate, personal relationships; conversely, informational and instrumental support are most frequently expressed through professional
relationships (Heaney & Israel, 2008; House, 1981). Consistent with literature, novice teachers in this study perceived the greatest degree of support in the emotional/appraisal construct. However, similar mean and standard deviation results among the three social support constructs suggests novice teachers were either challenged to discern the specific type of social support they perceived as available from the non-school and school sources of support, or the types of support were too similar to differentiate. Further research is needed with a larger sample of teachers to delineate novice teachers’ perceptions of the individual social support constructs.

The purpose of research objective three was to describe the perceived level of teacher self-efficacy in novice agricultural education teachers. Novice agricultural education teachers in this study indicated the greatest level of teacher self-efficacy in the area of instructional practices, followed by classroom management and student engagement, respectively. On average, novice teachers in this study believed they had quite a bit of influence to bring about desired outcomes of student engagement and learning, regardless of how difficult or unmotivated the student may be (Tschannen-Moran & Woolfolk Hoy, 2001).

Literature confirms low teacher self-efficacy is a primary reason teachers choose to leave the profession (Brown et al., 2014; McKim & Velez, 2015; Swam et al., 2011; Tschannen-Moran & Woolfolk-Hoy, 2001), and low perceptions of teacher self-efficacy negatively impact student achievement (Hancock & Scherff, 2010; Kelly & Northrop, 2015; Sorenson & McKim, 2014; Struyven & Vanthournout, 2014). Whereas the most influential source of teacher self-efficacy is mastery experiences, (Bandura, 1977), the effectiveness of a mastery experience and one’s determination of a successful performance is influenced by verbal or social persuasion (Bandura, 1986). Unfortunately novice teachers, who are in the most critical and formative stages of their development, have limited mastery experiences to draw upon (Tschannen-Moran & Woolfolk Hoy, 2007). As a result, researchers recommend that administrators structure formalized mentoring and induction programs that provide novice teachers opportunities to acquire mastery experiences that include timely and constructive feedback (i.e., social or verbal persuasion). These opportunities, combined with vicarious experiences with experienced teachers, may stimulate physiological and emotional arousal, thus enhancing teacher self-efficacy.

The intent of research objective four was to describe the contribution of perceived support from non-school sources and school sources toward teacher self-efficacy in novice agricultural education teachers. It was concluded the cumulative effects of non-school sources of support were not statistically significant predictors of teacher self-efficacy. However, novice teachers’ perceptions of available support from school sources contributed a significant and unique proportion of the variance in teacher self-efficacy for novice teachers of agriculture. Specifically, novice agricultural education teachers’ perceptions of support from school sources—predominantly students and community—explained 27.1% of the variance in teacher self-efficacy. Thus, the results from this study imply the support novice agricultural education teachers perceive from students and community are the most significant predictors of teacher self-efficacy.

Although the psychological construct of support is complex, researchers confirm the characteristics of support are demonstrated within the context of relationships, which contributes to an individual’s physiological, psychological, and emotional well-being. A relationship is “an association between two interacting partners,” wherein trust, loyalty, and mutual commitment are developed over time (Cropanzano & Mitchell, 2005, p. 883). Moreover, quality relationships demonstrate reciprocity, are founded in mutual trust and respect, and are characterized by frequent interactions which result in emotional familiarity and mutually beneficial outcomes (Heaney & Israel, 2008). As novice teachers strive to develop relationships with students and community whom they can rely on to provide social support, the psychological state of trust grows from within.
the dynamics of a quality relationship. Trust involves (a) the reciprocity to care for and demonstrate consideration of another person; (b) feelings of mutual obligation, honesty, and vulnerability; and (c) an expectation that the emotional investment expressed within the relationship will result in positive intentions or behaviors (Cropanzano & Mitchell, 2005; Dirks & Ferrin, 2002; Evans & Revelle, 2008; Rotter, 1971). Support and trust are the foundations of a quality relationship; over time, positive day-to-day exchanges with students and community can deepen the level of trust and support in relationships, lead to interpersonal attachment, and help affirm novice teachers’ beliefs that others support and trust their abilities as a teacher. As such, further research is needed to explore the relationship between perceptions of support and trust from school sources of support (e.g., principal, colleagues, students, parents).

Research objective five was used to determine the contribution of the types of social support on novice teacher self-efficacy. Although individual types of social support were not significant, the statistical significance of the overall model affirms the need for support. This finding is consistent with literature that substantiates the overall benefits of psychological support to cope with professional and personal life stressors (Cohen, 2004; DeAngelis et al., 2013; Fantilli & McDougall, 2009; Nurullah, 2012), and mitigate the psychological challenges of reality shock, culture shock, and isolation (Caspersen & Raaen, 2013; Heaney & Israel, 2008; Langley et al., 2014). To further enhance the impact of support, the most beneficial support is provided within the context of a relationship founded on mutual trust and respect (Brouwers et al., 2001; Cohen, 2004; DeAngelis et al., 2013; Lakey & Cohen, 2000; Nurullah, 2012; Uchino, 2009). In an effort to improve teacher retention, novice teachers must feel valued and supported to reduce attrition (Burke et al., 2015; Hancock & Scherff, 2010).

Findings and conclusions drawn from this research provide opportunities for school administrators and teacher educators to integrate best practices in mentoring and induction programs. In an effort to increase student achievement, improve job satisfaction, and enhance career commitment for novice teachers, school administrators should devote more time and resources to the development of teacher self-efficacy. Successful mentoring or induction programs should allocate designated times for novice teachers to collaborate with mentors about instructional strategies, reflect on experiences, and observe teachers in their classroom environment (i.e., vicarious experiences) (Kram & Ragins, 2007; National Commission on Teaching and America’s Future, Carroll, 2005). The cumulative effects of mastery and vicarious experiences, supported with verbal or social persuasion, will nurture physiological and emotional stimulation; thus, potentially enhancing efficacious beliefs.

Teacher educators and agricultural educational professionals should consider offering courses, professional development, or mentoring opportunities with experienced educators to share the benefits of psychological support and its subsequent impacts on teacher self-efficacy. Improved awareness of specific ways in which school and non-school sources can convey support will help novice agricultural education teachers minimize the challenges of the profession, feel efficacious in their role as an educator and FFA advisor, and promote longevity as a career educator. Awareness of the psychological construct of support and its impact will be most effective at increasing teacher self-efficacy, improving career commitment, and reducing attrition when novice teachers of agriculture develop the awareness to recognize support, the emotional capacity to feel worthy of support, and demonstrate a willingness to seek out and accept support when offered.

Limited research has been completed in education on ways to access and utilize social support to enhance teacher self-efficacy, whereby potentially reducing attrition. Future directions for investigation include qualitative and quantitative research to evaluate perceptions of social support among five groups of agricultural education teachers: (a) pre-service teachers; (b) novice
teachers who are currently teaching; (c) mid-career teachers; (d) teachers who left the profession; and (e) veteran teachers who have remained in the profession. Researchers should explore differences among each group of educators relative to their years of teaching experience, stage of teacher development (Fuller, 1969), relationship with a spouse or partner, and gender. In an effort to enhance teacher self-efficacy and potentially reduce teacher attrition, it is essential for teacher educators, school administrators, and agricultural education professionals to determine specific practices to enhance novice teachers’ perception of available support.

References


Exploring Undergraduate Students’ Attitude Toward Undocumented Immigration: Implications for Agricultural Education

Shuyang Qu1, Caitlin Bletscher,2 & Alexa Lamm3

Abstract

Undocumented immigration has become a hot political topic. Considering the significant role undocumented immigrants play in U.S. agricultural and natural resources industry and the voting power of the undergraduate students, this study assessed undergraduate students’ attitudes toward undocumented immigrant issues. Using a slightly altered Attitudes toward Illegal Aliens Scale, we found the undergraduate students in general had an undecided attitude concerning issues toward undocumented immigration in the U.S. We also found students’ gender, political beliefs, and race played a significant role in the development of their attitude toward immigration issues. We recommend agricultural educators to integrate immigration issues and intercultural courses in their programs to help students better understand immigration issues and prepare students to work in the agricultural industry where they will inevitably encounter these issues. Future research should investigate factors that specifically shapes undergraduate students’ attitudes toward immigration issues, such as past experiences with immigrants and media exposure.

Keywords: Undocumented immigration, undergraduate students, attitude, agriculture, education.

Introduction

An estimated 900,000 undocumented immigrants live in the State of Florida (Chardy, 2014). This population has played a significant role in Florida’s agricultural and natural resource industries, where more than 50% of its farmworkers are undocumented immigrants (Maxwell, 2012). This remains consistent with the entire nation, where the U.S. Department of Agriculture reported the number of hired farmworkers was between 1 and 2.5 million for 2006, and only 22% was US-born workers, and a significant portion of the hired foreign farmworkers was undocumented (Gilbert, 2005; Kandel, 2006; Nisbet, n.d.). Two key political issues have influenced Florida residents’ perspectives and attitudes toward undocumented immigrants in the past few years: drivers’ licenses and in-state college tuition. In response to these political issues, immigration activists have launched a campaign urging the Florida State Legislature to pass a law that would allow foreign nationals without immigration status to apply for drivers’ licenses (Chardy, 2014). Considering issues surrounding higher education, Florida Governor Rick Scott signed a bill to offer undocumented students in-state college tuition (Grovum, 2014), a politically controversial decision.

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Undergraduate students are a significant population, making up more than 20 percent of the voting population (Gendreau, 2016). In the 2016 Presidential election, Millennials – ages 18 to 29 – represented nearly 50 percent of the entire voter population (The Best Colleges, 2017); these new voting opinions have the potential to drastically influence US policy-making now and even more so in the future. Recently, even more young people are engaging in the political discussion surrounding immigration through two distinct forms: demonstrations and social media (Luntz, 2016). Following the conclusion of the 2016 Presidential Election, students at colleges across the country have organized and held rallies to pressure their institutions to protect its undocumented students (Svrluga, 2016). Such demonstrations have generated a multitude of response on social media, stimulating political conversation stemming across opinions, beliefs, and attitudes. Now more than ever, these forms of civic engagement and activism are intertwined with political discourse on social media (Brown, 2016). In the coming years, the biggest test will be presented to college students on social media, as they explore how to use this medium to determine the future of democracy and social justice (Brown, 2016).

The understanding, discourse, and activism surrounding immigration policy span beyond the impact on the lives of immigrants themselves, but also on the well-being of U.S. citizens, employment, national security, and the prosperity of industries employing undocumented immigrants (i.e. agriculture). Hence, ill-informed policy decisions can create severe consequences to agricultural industries due to the large number of immigrant populations working in U.S. fields (Rosenblum, 2009, 2011; Silver, 2012). Therefore, it becomes essential to create well-informed, engaged, aware, and knowledgeable new voters, who hold a significant influence on U.S. immigration policy and will inevitably encounter undocumented immigration issues in their workplace. The purpose of this research study aligns closely with the American Association for Agricultural Education’s Research Priority Area 3: Sufficient Scientific and Professional Workforce That Addresses the Challenges of the 21st Century (Roberts, Harder, & Brashears, 2016). This section of the National Research Agenda identifies effective methods, models, and programs that will prepare people to work in a global agriculture and natural resource workforce as a necessary area of scientific focus (Roberts et al., 2016, p. 31).

Theoretical Framework and Literature Review

Attitudes toward Undocumented Immigration: Schema Theory

This study sought to explore undergraduate students’ attitudes toward undocumented immigration. The theoretical foundation that guided this study was schema theory (Piaget, 1952). The concept of schema was proposed by Piaget in 1952 to explain the intelligence of children. The theorist suggested that, since childhood, people organize information into units, attempting to adapt the external world into pre-existing units. Building from this foundational work, Fournier (2009) defined schemas as mental representations that an individual builds over time based on his or her life experiences, using them to establish social information into idea units. Nishida (1999) further explained that schemata were the ‘pre-acquainted knowledge’ that individuals stock in their minds. When an individual goes into a familiar situation, he or she will retrieve a stock of knowledge, feelings, rationales and behaviors that are associated with the situation. Thus, people’s social worlds are “usually constituted within a framework of familiar and pre-acquainted knowledge about various situations” (Nishida, 1999, p.754).

The concept of schema has been applied to research topics within psychology, sociology, intercultural communication, and political science (Abelson,1981; Barsalow & Sewell, 1985; Bower, Black, & Turner, 1979; Bryan, Dweck, Ross, Kay, & Mislavsky, 2009; Chang, 2009; Gregoire, 2003; Hajek & Giles, 2005; Nishida, 1999; Nussbaum & Dweck, 2008; Olson & Dweck,
2008; Solso, 2003; Timperly & Robinson, 2001; Turner, 1994). These studies have demonstrated that individuals process information and form their attitudes from their pre-existing lens rather than experiencing something completely novel. This process allows the individual to organize the situation quickly based on prior experience (Solso, 2003). On the other hand, new schemata can be formed, replacing old schema to interpret the situation when the situation is so new and overwhelming (Graber, 1988). In addition, different schemata become activated at certain times based on different social environments corresponding to experiences and expectations (Haidt, 2001).

Intercultural communication is frequently analyzed by schema theory about an individual’s psychological reactions to unfamiliar environments such as cultural shock, uncertainty reduction, and value orientation (Nishida, 1999). Schema theory has also been used to explain issues related to immigration (Strauss, 2013). A significant amount of literature has documented individuals’ positive and negative attitudes toward immigration issues. Positive attitudes have focused on showing humanitarian values to minorities (Cowan, Martinez, & Mendiola, 1997; Katz & Hass, 1988) and undocumented immigrants filling undesirable jobs in the labor market (Odera & Lamm, 2013). The humanitarian values discussed “liberalism and empathic responses to the need and aspirations of minorities, sympathy for minorities, and support of public efforts to improve the lives of minorities” (Cowan, Martinez, & Mendiola, 1997, p. 405), therefore showing acceptance of minorities. Additionally, Odera and Lamm (2013) found that people appreciate the contribution of undocumented immigrants, simply because this population fills the need of hard labor that tends to not be desirable among domestic workers.

Negative attitudes toward undocumented immigration can be summarized by prejudice theory (Stephan & Stephan, 2000): realistic threats, symbolic threats, intergroup anxiety, and negative stereotypes. Stephan and Stephan’s (2000) studies demonstrated prejudice toward immigrants from Mexico, Asia, and Cuba in the U.S. Examples of realistic threats relating to perceived immigration issues are “crime, drugs, disease, job loss and economic costs for health education and welfare” (Stephan & Stephan, 2000, p. 28). Symbolic threats contain cultural differences such as “work, family, religious, and moral values” (p. 28) that are perceived differently and unfavorably by natives. Intergroup anxiety describes the perceived feeling of worry, anxiety, tension, and discomfort when interacting with minorities such as undocumented immigrants. Common negative stereotypes of immigrants include “dishonest, unintelligent, and clannish” (p.29).

Public opinion about U.S. immigration has shifted from a more liberal stance after World War II to a more conservative and negative position after the Immigration and Nationality Act Amendment in 1965 (Espenshade & Hempstead, 1996; Harwood, 1986; Morris, 1985; Odera & Lamm, 2013; Simon, 1985). Demographics have been shown to make a significant difference in people’s attitude toward undocumented immigration. Espenshade and Calhoun (1993) analyzed southern Californian residents’ opinions toward undocumented immigration and found that foreign born respondents who held higher wages and higher education tended to view undocumented immigration as less severe of an issue (Espenshade & Hempstead, 1996). Public opinion reports in the state of Florida (Odera & Lamm, 2013) showed that respondents have mixed feeling about issues with undocumented immigration. Respondents felt differently when asking about issues related to immigration, ranging from education opportunity for children of undocumented immigrants, to economic issues, government subsidies, and rights for the return of undocumented immigrants. For example, in regards to the Floridian economy, half of the study’s respondents thought undocumented immigrants filled jobs that domestic workers are not willing to take, while 69 percent thought undocumented immigrants are a burden on the economy (Odera & Lamm, 2013).
Agricultural Education and Undocumented Immigration

A significant lack of research exists among immigrant and migrant farm workers recently published within U.S. agricultural education journals (Beck & Bodur, 2015). Several scholars acknowledge that this lack of research and previous literature is not surprising, due to the controversial nature of the topic and the harsh realities of immigration (Beck & Bodur, 2005). Historically, agricultural education as a discipline has struggled with issues of inclusion and diversity in both secondary education and within the profession (Bowen, 2002).

However, a significant amount of research has been conducted within the field of agricultural education as it applies to cultural diversity at large. Through his research synthesis on culture within the Journal of Agricultural Education, Tubbs (2015) presented five categorical areas that outlined efficiencies and deficiencies in agricultural education research toward culture. He concluded that research within agricultural education related to culture and diversity has been quite limited, presenting mostly demographic conditions of culture (e.g. gender and ethnicity).

Hains et al. (2013) exposed pre-service agricultural teachers to different cultures. Through this exposure, participants indicated experiencing a deeper understanding of other cultures, recognizing a fundamental need to develop and shift their pedagogy to best address a diversity of needs in the classroom. Such cultural competency begins with teacher education programs, in order to enhance intercultural exposure and understanding for the future achievement of all students (Taylor, 2010). Similarly, Talbert and Edwin (2008) investigated how agricultural education programs prepared teacher education students to work with diverse populations. However, study results from university students involved with student teaching and early field experience showed mixed results.

Despite the lack of research among undocumented immigrants specifically, this population is significant to consider within the agricultural industry. Many scholars suggest that Latino farmworkers are key to revitalizing and invigorating our agricultural sector, our schools, and rural economies (Curbelo, 2006; Merrill, 2004; Mullinix, Garcia, Lewis-Lorentz, & Qazi, 2006). A study by Mullinix et al. (2006) examined immigrant Latino populations in central Washington State concluding that a majority of respondents would encourage their children to pursue agricultural careers if they had the appropriate educational preparation. The researchers provided a call to action for colleges of agriculture to appropriately serve this talented and dedicated population of future U.S. agriculturalists.

By involving and recruiting Latinos in agricultural education programs, educators and Colleges of Land Grant universities will best diversify their agricultural sciences and secondary agricultural education programs (Curbelo, 2006). Due to globalization, the U.S. agricultural industry must work collaboratively with immigrants in order to encourage the next generation of farmers and agriculturalists and revitalize family-based agriculture and rural communities that exist within the US (Mullinex, et al., 2006). Both universities and its students must be able to successfully navigate diversity in this globalized, intercultural industry, which works alongside a multitude of foreign-born and undocumented immigrants (Rodriguez & Lamm, 2016). Many educators would agree that the entire U.S. agricultural system has become significantly dependent upon immigrant labor. Having a direct impact on tomorrow’s leaders of agriculture, it becomes essential for agricultural educators to facilitate a further understanding of immigration labor among students and fellow faculty.

Given the sensitive nature of immigration topics, coupled with the need for further discussion and consideration, it is necessary to explore not only the attitudes that individuals hold
toward undocumented immigration, but the schemata behind these attitudes. With that, agricultural educators and communicators can better inform undergraduate students on immigration related issues and develop effective messages that resonate with their experiences, creating messages that are overwhelming enough to overwrite old schemata to better inform their audience.

Purpose and Objectives

The objective of this study was to assess undergraduate students’ attitudes toward undocumented immigrant issues. Specific objectives were:

1. To determine undergraduate students’ attitude toward issues of undocumented immigration.
2. To compare undergraduate students’ attitude toward issues of undocumented immigration between gender, political belief, ethnicity and race, and year of college.

Methodology

We conducted an online survey to examine undergraduate students’ attitudes toward issues about undocumented immigration in the agricultural and natural resource industries. A survey was administered online through Qualtrics. The population of this study was undergraduate students at University of Florida. This population was chosen because of a large number of undocumented immigrants in Florida, its significance to agricultural and natural resource industries, and the land-grant university mission of teaching agriculture-related arts (Association of Public and Land-Grant Universities, 2012; Chardy, 2014; Maxwell, 2012.) We selected a sample ($n = 189$) of undergraduate students from those enrolled in the Fall 2014 section of a large oral communication course from a Land-grant university in Florida. The oral communication class at University of Florida is offered to all students on campus. The composition of the students is diverse in demographics and discipline, which makes a reasonable representation of the population of the interest for this study. A total of 85 respondents out of 189 students completed the survey, generating a 45.0% response rate. Each student volunteered to answer the online survey consisting of a list of questions measuring attitude toward undocumented immigration, as well as demographic characteristics including gender, race and ethnicity, political belief, and year of college. We measured the attitudes toward undocumented immigrants by respondents’ levels of agreement with 19 statements on a five-point Likert-scale. We slightly altered the list of statements from the Attitudes toward Illegal Aliens Scale developed by Ommundsen and Larsen (1997; 1999). Examples of the statements included, “Undocumented immigrants should not benefit from my tax dollars” and “All undocumented immigrants deserve the same rights as U.S. citizens.” Each of the statements was rated on a five-point Likert-scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. In term of the real limits, 1.00 – 1.49 was considered strongly disagree, 1.50 – 2.49 was disagree, 2.50 – 3.49 was undecided, 3.50 – 4.49 was agree, and 4.50 – 5.00 was strongly agree. Eight of the statements were reverse coded and all 19 were summed and averaged to create an overall index score.

We analyzed the data using Statistical Package for Social Science (SPSS) software. Likert-type items were treated as interval data (Clason & Dormody, 1994). Frequencies and descriptive statistics were used to fulfill objective one of the study. Inferential statistics including t-test, ANOVA, and Bonferroni tests were utilized to fulfill objective two of the study. We used a significance level of .05 for all statistical tests. We conducted Levene’s test, Shapiro-Wilk test, Skewness, and Kurtosis to check if the assumptions of homogeneity and normality were met for the t-tests and ANOVA tests. The normality test was found violated when conducting an ANOVA test to examine the attitude of undocumented immigration among different political beliefs. Instead,
Kruskal-Wallis H Test was used to examine the attitude of undocumented immigration among different political beliefs.

**Results**

**Objective 1: Determine undergraduate students’ attitude toward issues of undocumented immigration.**

Survey results revealed respondents were undecided in general concerning their attitudes toward undocumented immigration in the U.S. \((M = 3.1, SD = .79)\). Results of each statement of attitudes toward undocumented immigrants scale were listed in Table 1. The majority of the respondents agreed or strongly agreed with the following statements: “Undocumented immigrants have rights too;” “Undocumented immigrants should not be discriminated against;” “Undocumented immigrants should be forced to go back to their own countries;” “Undocumented immigrants provide the U.S. with a valuable human resource;” “Undocumented immigrants should not benefit from my tax dollars.”

Table 1

<table>
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<th>Attitudes Toward Undocumented Immigrants Scale</th>
<th>Strongly disagree %</th>
<th>Disagree %</th>
<th>Undecided %</th>
<th>Agree %</th>
<th>Strongly agree %</th>
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<tbody>
<tr>
<td>Undocumented immigrants should not benefit from my tax dollars.</td>
<td>4.7</td>
<td>15.3</td>
<td>20.0</td>
<td>37.6</td>
<td>22.4</td>
</tr>
<tr>
<td>Our taxes should be used to help those residing without documentation in the U.S.</td>
<td>11.8</td>
<td>38.8</td>
<td>27.1</td>
<td>16.5</td>
<td>5.9</td>
</tr>
<tr>
<td>There is enough room in this country for everyone.</td>
<td>9.4</td>
<td>32.9</td>
<td>8.2</td>
<td>36.5</td>
<td>12.9</td>
</tr>
<tr>
<td>Undocumented immigrants are not infringing on our country's resources.</td>
<td>7.1</td>
<td>45.9</td>
<td>18.8</td>
<td>27.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Undocumented immigrants are a nuisance to society.</td>
<td>18.8</td>
<td>42.4</td>
<td>28.2</td>
<td>10.6</td>
<td>0</td>
</tr>
<tr>
<td>There should be open international borders.</td>
<td>23.5</td>
<td>32.9</td>
<td>22.4</td>
<td>12.9</td>
<td>8.2</td>
</tr>
<tr>
<td>Access to this country is too easy.</td>
<td>12.9</td>
<td>34.1</td>
<td>27.1</td>
<td>24.7</td>
<td>1.2</td>
</tr>
<tr>
<td>Undocumented immigrants should be excluded from social welfare.</td>
<td>5.9</td>
<td>28.2</td>
<td>25.9</td>
<td>31.8</td>
<td>8.2</td>
</tr>
<tr>
<td>Undocumented immigrants who give birth to children in the U.S. should be made citizens.</td>
<td>3.5</td>
<td>30.6</td>
<td>23.5</td>
<td>30.6</td>
<td>11.8</td>
</tr>
</tbody>
</table>
Table 1 (continued)

*Attitudes Toward Undocumented Immigrants Scale*

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undocumented immigrants cost the U.S. millions of dollars each year.</td>
<td>3.5</td>
<td>23.5</td>
<td>27.1</td>
<td>35.3</td>
<td>10.6</td>
</tr>
<tr>
<td>Undocumented immigrants should be eligible for welfare.</td>
<td>9.4</td>
<td>30.6</td>
<td>29.4</td>
<td>27.1</td>
<td>3.5</td>
</tr>
<tr>
<td>Undocumented immigrants provide the U.S. with a valuable human resource.</td>
<td>5.9</td>
<td>17.6</td>
<td>23.5</td>
<td>42.4</td>
<td>10.6</td>
</tr>
<tr>
<td>The government should pay for care and education of undocumented immigrants.</td>
<td>14.1</td>
<td>38.8</td>
<td>20.0</td>
<td>22.4</td>
<td>4.7</td>
</tr>
<tr>
<td>Undocumented immigrants should not have the same rights as U.S. citizens.</td>
<td>9.4</td>
<td>24.7</td>
<td>30.6</td>
<td>29.4</td>
<td>5.9</td>
</tr>
<tr>
<td>Undocumented immigrants have rights too.</td>
<td>0</td>
<td>1.2</td>
<td>12.9</td>
<td>63.5</td>
<td>22.4</td>
</tr>
<tr>
<td>Taking care of people from other nations is not the responsibility of the U.S.</td>
<td>9.4</td>
<td>36.5</td>
<td>30.6</td>
<td>18.8</td>
<td>4.7</td>
</tr>
<tr>
<td>All undocumented immigrants deserve the same rights as U.S. citizens.</td>
<td>10.6</td>
<td>29.4</td>
<td>30.6</td>
<td>20.0</td>
<td>9.4</td>
</tr>
<tr>
<td>Undocumented immigrants should be forced to go back to their own countries.</td>
<td>18.8</td>
<td>37.6</td>
<td>29.4</td>
<td>10.6</td>
<td>3.5</td>
</tr>
<tr>
<td>Undocumented immigrants should not be discriminated against.</td>
<td>0</td>
<td>8.2</td>
<td>22.4</td>
<td>41.2</td>
<td>28.2</td>
</tr>
</tbody>
</table>

More than half of the respondents disagreed or strongly disagreed with the following statements: “Our taxes should be used to help those residing without documentation in the U.S.;” “Undocumented immigrants are not infringing on our country's resources;” “Undocumented immigrants are a nuisance to society;” “There should be open international borders;” and “The government should pay for care and education of undocumented immigrants.”

No respondent strongly agreed with the statement, “Undocumented immigrants are a nuisance to society.” No respondents strongly disagreed with the statements, “Undocumented immigrants have rights too;” and “Undocumented immigrants should not be discriminated against.”
Objective 2: Compare undergraduate students’ attitude toward issues of undocumented immigration between gender, political belief, ethnicity and race, and year of college.

The second objective was to compare respondents’ attitudes toward undocumented immigration between different demographic groups. The mean score of attitude toward undocumented immigration and the associated standard deviation are listed in Table 2. The large standard deviation of the very conservative group and the small standard deviation of other groups in political beliefs stood out. This may result from the low number of respondents in these two groups.

Table 2

Mean Scores of Attitudes Toward Undocumented Immigration by Demographic Groups

<table>
<thead>
<tr>
<th>Demographic Group</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>23</td>
<td>2.83</td>
<td>.62</td>
</tr>
<tr>
<td>Female</td>
<td>62</td>
<td>3.19</td>
<td>.74</td>
</tr>
<tr>
<td>Political Belief</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very liberal</td>
<td>6</td>
<td>3.82</td>
<td>.57</td>
</tr>
<tr>
<td>Liberal</td>
<td>27</td>
<td>3.50</td>
<td>.59</td>
</tr>
<tr>
<td>Moderate</td>
<td>29</td>
<td>3.04</td>
<td>.60</td>
</tr>
<tr>
<td>Conservative</td>
<td>18</td>
<td>2.35</td>
<td>.42</td>
</tr>
<tr>
<td>Very conservative</td>
<td>2</td>
<td>2.87</td>
<td>1.67</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>3.07</td>
<td>.17</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>18</td>
<td>3.38</td>
<td>.62</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>67</td>
<td>3.02</td>
<td>.74</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>50</td>
<td>2.85</td>
<td>.62</td>
</tr>
<tr>
<td>Black</td>
<td>5</td>
<td>3.85</td>
<td>.93</td>
</tr>
<tr>
<td>Asian</td>
<td>18</td>
<td>3.32</td>
<td>.47</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
<td>3.53</td>
<td>.91</td>
</tr>
<tr>
<td>Year of college</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshmen</td>
<td>5</td>
<td>2.42</td>
<td>.39</td>
</tr>
<tr>
<td>Sophomore</td>
<td>28</td>
<td>3.02</td>
<td>.72</td>
</tr>
<tr>
<td>Junior</td>
<td>37</td>
<td>3.27</td>
<td>.76</td>
</tr>
<tr>
<td>Senior</td>
<td>15</td>
<td>3.02</td>
<td>.62</td>
</tr>
</tbody>
</table>
Gender

We conducted a \( t \)-test to examine the differences in respondents’ general attitudes toward undocumented immigration between male and female demographics. Results showed that female respondents (\( M = 3.19, SD = .74 \)) had a significantly positive attitude toward undocumented immigration than male (\( M = 2.82, SD = .62 \)) (\( t(83) = -2.10, p = .04 \)). Therefore, gender plays an important role for undergraduate students’ attitude toward issues related to undocumented immigration.

Political Belief

We conducted a Kruskal-Wallis H Test to examine the differences in respondents’ general attitudes toward undocumented immigration between political beliefs (liberal, moderate, conservative, very conservative, and other). A Kruskal-Wallis H test showed that there was a statistically significant difference in the attitude of undocumented immigration among different political beliefs, \( \chi^2(5) = 35.61, p < 0.001 \), with a mean rank attitude score of 68.08 for respondents who identified themselves as very liberal, 56.37 for liberal, 42.05 for moderate, 16.75 for conservative, 39.74 for very conservative, and other for other. Pairwise comparison demonstrated that significant differences existed between those identified themselves as conservative and moderate (\( \chi^2 = 25.30, p = .009 \); \( M_{\text{conservative}} = 2.45, SD = .58 \); \( M_{\text{moderate}} = 3.04, SD = .60 \)); between conservative and liberal (\( \chi^2 = 39.62, p < .001 \); \( M_{\text{conservative}} = 2.45, SD = .58 \); \( M_{\text{liberal}} = 3.50, SD = .59 \)); and between conservative and very liberal (\( \chi^2 = 39.62, p < .001 \); \( M_{\text{conservative}} = 2.45, SD = .58 \); \( M_{\text{very liberal}} = 3.82, SD = .57 \).

Ethnicity and Race

We used a \( t \)-test to examine whether or not the respondents’ attitudes toward undocumented immigration differed between Hispanic and non-Hispanic respondents. Result indicated a significant difference (\( t(84) = 2.18, p = .03 \)) between the two groups. Hispanic respondents (\( M = 3.42, SD = .63 \)) had a significantly positive attitude toward undocumented immigration than non-Hispanic respondents (\( M = 3.02, SD = .74 \)).

A one-way ANOVA test was conducted to test the differences in respondents’ attitudes toward undocumented immigration among different races (Asian, Black, White, and other). Results indicated a significant difference among different races (\( F = 7.07, p < .01 \)). Post hoc comparisons using Bonferroni test indicated that respondents who identified themselves as white (\( M_{\text{white}} = 2.84, SD = .62 \)) had a significantly negative attitude toward undocumented immigration than those who identified themselves as black (\( M_{\text{black}} = 3.85, SD = .93, p = .01 \)). Respondents who identified themselves as Asian (\( M_{\text{Asian}} = 3.32, SD = .47 \)) did not show significant differences with black or white respondents.

Year of college

We conducted a one-way ANOVA to assess if there was a difference among respondents from different years of college. Result showed no significant difference among freshmen, sophomore, junior, or senior respondents (\( F = 2.43, p = .07 \)). Therefore, years of college cannot differentiate undergraduate students’ attitude toward undocumented immigration issues.
Conclusions and Implications

Overall, we found an undecided attitude toward undocumented immigration among undergraduate students. Undergraduate students in this large, southeast university had mixed attitudes about issues related to undocumented immigration, which aligned with the findings of other public opinion studies (e.g., Odera & Lamm, 2013). The majority of respondents agreed that undocumented immigrants had rights, they should not be discriminated against, they were a valuable human resource, and they were not a nuisance to society; however, respondents also agreed that they are infringing on the country’s resources, should not benefit from the respondents’ own tax dollars, the country should not open international borders and should not pay for their care and education, and they should be forced to go back to their own countries. The results indicated that undergraduate students showed respect for undocumented immigrants as human beings. However, the undergraduate students did not agree on their economic support. The results aligned with the theory of prejudice, which suggests that job loss and economic costs are closely related to the negative attitude toward undocumented immigration.

This study also showed polarizing sentiments toward rights and social welfare in regards to immigration. Respondents were completely split on whether undocumented immigrants should not have the same rights as U.S. citizens. The respondents were also split on their attitudes about whether undocumented immigrants should be excluded from social welfare.

Demographics of gender, ethnicity, and race, and political belief demonstrated significant influence in attitudes and beliefs toward issues involving undocumented immigration. Females held a significantly more positive attitude toward undocumented immigration than their male counterparts. Individuals who identified themselves as white held a significantly negative attitude toward undocumented immigration than those who identified themselves as black; individuals who identified themselves as Asian did not show significant differences with black and white respondents. Individuals who identified themselves as conservative held significantly more negative attitudes toward immigration issues compared to those who indicated themselves as moderate, liberal, and very liberal in their political beliefs.

Odera and Lamm’s (2013) study of Floridian residents’ beliefs and attitudes toward undocumented immigrants validated several elements presented in this study. Odera and Lamm (2013) showed that a majority of Florida residents believed that undocumented immigrants were a burden on the economy, while 31% thought undocumented immigrants were assets to the economy. These results validated the findings of this study, where a majority of undergraduate students believed that undocumented immigrants infringe on U.S. resources. The undecided split on whether respondents felt that undocumented immigrants filled unwanted American jobs or reduced good jobs for Americans also validated the results of this study, which proposed the uncertainty, complexity, and ambiguity of issues involving undocumented immigrants.

Recommendations

The results of this study reflected undergraduate students’ perceptions that although undocumented immigrants should have rights, most believed that this population was a burden to the U.S. economy. Ultimately, however, their attitudes varied among undergraduate students. Due to the complexities of these issues and the considerable impact on U.S. agriculture, it is urgent for the undergraduate students (new and future voters) to become better informed about these issues. The first steps to enhancing diversity and cultural competency into the field of agricultural education stem from first understanding what culture is, what the profession’s culture is, and how cultural biases are held within agricultural education (Tubbs, 2015). Therefore, agricultural
educators should integrate immigration issues in their educational experiences and offer intercultural courses to help students better understand immigration issues to appropriately prepare students to work in the agricultural industry where they will inevitably encounter these issues. Agricultural educators should be aware of their students’ perceptions of undocumented immigration issues and provide proper education about the connections between agriculture, (undocumented) immigration, and society. Integrating topics such as the history of immigration, the role of undocumented immigrants within the U.S. agricultural industry, and intercultural communication into agricultural education curriculum may be effective ways to educate undergraduate students in this topic.

Further research must be conducted to draw sound conclusions regarding undergraduate student perceptions toward undocumented immigration in the U.S. Based on the undecided attitudes found in this study, qualitative studies investigating what has helped shape undergraduate students’ attitudes will be valuable in providing guidance for agricultural educators in developing immigration content-related lessons and programs. Such qualitative studies should focus specifically on the undecided items outlined in this study, such as social welfare for undocumented immigrants.

Based on schema theory, where individuals use prior experiences to analyze a situation, researchers should further examine how past experience with immigrants (documented or undocumented) and media exposure about immigration issues has influenced students’ attitudes toward immigration. Such studies will help agricultural educators gain insights into what specific experiences students need to have in order to better understand issues related to undocumented immigration.

The undocumented immigration attitude scale used in this study mainly captured the realistic threats of immigrants (Stephan & Stephan, 2000). According to Stephan and Stephan (2000), other threats that may be related to attitudes toward immigration included the potentially different “work, family, religious, and moral values” (p. 28) held by immigrants and stereotypes of immigrants as being “dishonest, unintelligent, and clannish” (p. 29). Future studies should consider modifying the undocumented immigration attitude scale in order to best capture these aspects. Such a refined scale has the potential to deepen the evaluation of individuals’ attitudes toward these issues and better inform educators about how to properly teach their learners.

This study was conducted in a southeastern university. Its results cannot be transferred to undergraduate students in other areas. To provide a more holistic view of undergraduate students’ attitudes toward undocumented immigration, future research should replicate this study in other areas and regions in the U.S. Such studies will provide comparisons to these results and generate meaningful recommendations for agricultural education throughout the U.S.

References


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Qu, Bletscher, & Lamm  Exploring Undergraduate Students’ Attitude …


A Practical Solution to Developing County Extension Director’s Leadership Skills: Exploring the Design, Delivery and Evaluation of an Online Leadership Development Program

Matthew Sowcik¹, Matt Benge,² & Jera Niewoehner-Green³

Abstract

County Extension Directors (CED) are tasked with a myriad of responsibilities, many of which are directly related to leadership skills. Despite the identification of competencies and skills needed by CEDs in order to maintain successful programs, little research has been conducted on actual Extension leadership programming. Even more uncommon in the literature is the evaluation of CED leadership development programs that utilize online delivery. Thus, the purpose of this study was to explore the outcomes of a primarily online leadership development program with the goal of developing 21st century soft skills in CEDs. The Leadership Short Course was built upon the leadership development foundations of Moore and Rudd (2005), Owen (2004) and Sanders (2014), while the program evaluation framework utilized the Kirkpatrick (1976) model to evaluate program participant reactions, learning, and behavior changes. Key findings indicate that the design and delivery of the program resulted in high participant satisfaction and significant increases in leadership knowledge and skill level. Positive outcomes in this type of online programming has implications for the design and implementation of future CED leadership programs.

Keywords: leadership, Extension, County Extension Directors

Introduction

Leadership development programs are a recognized way to increase an individual’s capacity to address unforeseen problems, initiate change, or effectively engage in the process of leading others (Day, 2000; McKee, Odom, Moore, & Murphrey, 2016). These programs are critical to the success of County Extension Directors (CEDs) who provide leadership at the local level with regards to developing and implementing programs, managing budgets, addressing stakeholders needs, attending to policy, and serving as the link between Extension agents and upper levels of Extension administration (Jayaratne, Owen & Jones, 2010; Sanders, 2014). Furthermore, the anticipated challenge of replacing a large number of CEDs in the future, due to the retirement of the baby boomer generation, highlights the importance of having effective leadership programs established to develop the needs of new leaders. (Jayaratne et al., 2010; Moore & Rudd, 2005). As

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a system that primarily promotes from within (Jayaratne, Owen & Jones, 2010; Moore & Rudd, 2005), internal programming can aid in cultivating and sustaining effective leadership.

It is commonly recognized that developing the competencies and skills of CEDs is a critical priority for Extension (Jayaratne, Owen & Jones, 2010), yet few CEDs have the leadership competencies needed to be effective in their administrative position (Sanders, 2014). This may be due to a number of factors impacting the successful design and implementation of CED leadership development programs. First, research from Campbell, Grieshop, Sokolow and Wright (2004) suggests CEDs are inadequately supported in their leadership roles. Additionally, as funding is cut or restricted, often the first programs to be eliminated include those associated with professional development. Finally, leadership development often competes against other tasks with greater perceived importance as CEDs try to manage the various demands on their time. This, once again, puts the development of CED leadership skills on the back burner.

An increasing need for systematic evaluation of leadership programs to measure and communicate the program’s worth places added pressure on CEDs to make sure their resources are being utilized effectively. As Jayaratne, Owen, and Jones (2010) point out, “when resources are scarce and funding agencies are demanding program impacts for accountability, the demand for evaluation is obvious” (p.18). However, few leadership programs in general are evaluated and even fewer programs publish their findings so others in the field can learn and build off their results. This is especially true concerning Cooperative Extension based leadership programs, where a dearth in the research exists. The Agricultural Education National Research Agenda (Roberts, Harder, & Brashears, 2016) emphasizes the importance for agricultural educators to “determine the most effective means for incorporating and assessing soft skills development in both formal and nonformal settings” (p.30). The authors of this paper aim to contribute to the current base of research on Extension-based leadership development programs by exploring the design, delivery, and evaluation of an online CED leadership program designed to develop 21st century leadership skills.

Conceptual Framework

Over the past 50 years in Extension research, there has been an interest in the leadership skills critical for a County Extension Directors success. In 1977, Rodgers completed a dissertation examining the competencies critical to the administrative role of the County Extension Chairman. In the study, Rodgers found that four administrative functions: personnel management, program management, financial management, and office management, were important to the role of Georgia County Directors. Additionally, Rodgers identified 28 unique managerial competencies that corresponded with the four administrative areas such as communication, motivating, problem-solving, leading, planning, relationship building, and establishing work flow to name a few. Ten years later, the Georgia Extension Service conducted a study of skills essential to performing the managerial role of county directors (Whiteside & Bachtel, 1987). Of the 34 skills found in the study, the 10 most important skills for CED success included communicating, public relations, leading, planning, establishing and maintaining a good office image, budget accountability, decision making, evaluating, staff support, and motivating others.

As evidenced in more recent Extension research, similar skills have been associated with leadership competence. Moore and Rudd’s (2005) study identified six leadership skill levels of senior Extension leaders: human, conceptual, technical, communication, emotional intelligence, and industry knowledge skills. In addition, Owen (2004) studied CEDs from North Carolina Cooperative Extension and found 38 sub-competencies were important to CED long-term success, such as interpersonal relationships, emotional intelligence, conflict management, and
understanding self and others. Most recently, Sanders (2014) completed a study examining the leadership competencies and needs of CEDs in Florida Extension. In this research, Sanders (2014) points out:

The majority of CED professional development needs focus on human skills. These include conflict resolution, saying no when warranted, time management, listening, creating a supportive work environment, and relationship building. The highest priority conceptual skills for professional development programming include extension marketing, change implementation, and visioning. (p. 134)

Although this research has helped those in Extension better understand the skills and competencies critical to CED leadership success, the research into programs developing these skills, including program design, implementation and evaluation, is rare. One example comes from the research of Jayaratne et al. (2010) exploring a new and aspiring CED leadership education program. Utilizing both qualitative and quantitative analysis, the authors examined how the design and delivery of a leadership education program helped build CED leadership skills and behaviors. Recommendations from the research included more hands-on activities, team building exercises, problem solving sessions and a shorter time frame than nine months.

Even more uncommon in the literature is evaluation of CED leadership development programs that utilize online delivery. However, these types of programs are critically important for a few reasons. As Hall and Broyles (2015) suggest, “State Cooperative Extension budgets are tight and Extension administrators are looking for ways to compensate for reductions in funding” (p. 197). Sondgerath (2016) points to online leadership development programs as a way to reduce the cost associated with travel expenses and training materials. Additionally, CEDs have numerous demands on their time and often find it difficult to juggle all of their different roles (Sanders, 2014). Finding time to travel to a training and dealing with the demands of an inflexible training schedule often requires CEDs to eliminate these developmental opportunities for the good of their primary responsibilities. Online training, however, requires no additional travel time and provides an asynchronous program design.

**Evaluation Framework**

It is important to provide a systematic evaluation of agricultural leadership development programs to justify the costs and resources associated with the program delivery to key stakeholders (McKee et al., 2016). Evaluation also provides an opportunity to address feedback and make needed changes to increase the leadership program’s future success. One of the most extensively used approaches to evaluate leadership development programs is Kirkpatrick’s four ‘levels’ of criteria (1976). These four levels of training outcomes include:

- **Level 1: Reaction** – This level assesses the participants’ reaction to the leadership development program. Reaction questionnaires are most often utilized to measure participants’ affective responses to the training. This can include satisfaction with the training facilitator, content or the program overall;
- **Level 2: Learning** – At this level, participants’ learning is measured, based on changes in a participant’s knowledge, attitudes, skills, confidence or commitment. This change is driven by the goals and objectives outlined in development of the program. Level 2 can be assessed by utilizing performance tests or pre-post assessments;
- **Level 3: Behavior** – In the model, level three assesses changes that happen in participants’ behavior on the job and the extent to which learning from the program
has been applied to the participants’ jobs. Evaluation is completed through the use of observation, interviews, or collecting productivity data; and

- Level 4: Results – The final level assesses the impact the development program has had on the bottom-line of the broader organizational goals. The methods for assessment include measuring costs, quality, retention, and return on investment (ROI).

There are a few reasons the Kirkpatrick model has been utilized as a primary tool for evaluating leadership development programs over the past three decades (Bates, 2004). First, the model presents evaluation in a systematic way, which provides numerous data points. These different measures can also be utilized to address a diverse set of stakeholders’ interests (Bates, 2004). Finally, the model simplifies the complex process of leadership program evaluation. By dictating particular questions to address specific criteria and limiting the demands of numerous measurement points, the Kirkpatrick model streamlines the evaluation process (Bates, 2004).

Although the Kirkpatrick model is both a popular and straightforward evaluation tool, typically programs only target the two lower levels of the model. According to Kirkpatrick and Kirkpatrick (2016), approximately 58 percent of online programs measure level one, while level three is only measured 17 percent of the time. Furthermore, even when levels three and four are being assessed, the measures and questions used are more appropriate for level one outcomes (Kirkpatrick, & Kirkpatrick, 2016). More extensive evaluation at levels three and four provide an opportunity to collect valuable data that can be used by the organization to address organizational goals and to determine what programming elements add significant value.

Description of Program

Taking into account the general literature on CED leadership skills and focusing more specifically on the findings of Moore and Rudd (2005), Owen (2004) and Sanders (2014), the leadership development program offered leadership sessions that explored: (a) role of the leader; (b) leader identity; (c) building strong relationships with others; (d) creating an extraordinary leadership environment (e) best practices in leadership; and (f) continued leadership learning. The specific topics covered in these sessions are outlined in Table 1.
Table 1

Session Titles and Descriptions of the Leadership Short Course

<table>
<thead>
<tr>
<th>Session Title</th>
<th>Sections Covered in the Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roles of a Leader</td>
<td>Understanding the power of perception; establishing purpose; defining leadership priorities</td>
</tr>
<tr>
<td>Leader Identity</td>
<td>Developing humility, optimism, and continued learning mindset; appreciating differences (Myers Briggs Type Indicator personality inventory), understanding the power of emotions</td>
</tr>
<tr>
<td>Building Strong Relationships with Others</td>
<td>Authentic communication; conflict resolution and stress management</td>
</tr>
<tr>
<td>Creating an Extraordinary Leadership Environment</td>
<td>Reframing leadership; accountability and discipline; creating a culture of change</td>
</tr>
<tr>
<td>Leadership Best Practices</td>
<td>Cultivating creativity; teamwork and psychological safety; providing feedback and recognition</td>
</tr>
<tr>
<td>Developing a Leadership Development Plan</td>
<td>360-degree feedback</td>
</tr>
</tbody>
</table>

Based on participant feedback and suggestions to further improve the leadership program, Jayaratane, Owen and Jones (2010) recommended after conducting their CED leadership program to condense the overall length of the program from nine to four months. Keeping this in mind, the Leadership Short Course extended over three months while also providing two weeks between developmental sessions to encourage participants to practice what they learned during each session. The first five sessions were delivered online, while the final session was delivered in a face-to-face format reviewing the participants’ 360 evaluations. Program participants received a leadership program certificate for completion of the course.

**Purpose and Objective**

The purpose of this study was to explore the outcomes of a primarily online leadership development program with the goal of developing 21st century soft skills in CEDs. The research objective was to evaluate participants’ satisfaction, learning outcomes, and behavior changes from the Leadership Short Course.

**Methodology**

The Leadership Short Course took place from February through April, 2017. The target audience for program participation was Florida County Extension Directors. Program participants were selected via nomination from his/her District Extension Director. Selected participants were characterized as emerging leaders, risk takers, and exhibiting enthusiasm to advance themselves and UF/IFAS Extension. Out of 64 Florida CEDs, twenty-two were nominated and began the course; however, program participants were expected to stay engaged and complete the assignments, otherwise they would be removed from the course. Five program participants were removed during the first quarter of the course, ending with a program cohort completion rate of 77% ($n = 17$). Table 2 provides a brief description of final program cohort participants.
Two instruments were created to satisfy Kirkpatrick’s (1976) levels of training outcomes, both of which were sent via Qualtrics. The items and open-ended questions stemmed from the program objectives of the Leadership Short Course. Only the first three levels of the model were evaluated for this study, as not enough time had passed to satisfy the criteria of level four outcomes. The first instrument concentrated on the first two levels: reactions and learning outcomes. There were 17 statements pertaining to the learning outcomes using a retrospective pretest and a traditional posttest. Retrospective pretests asked respondents to recall their perceptions prior to engaging in the treatment at the same time they evaluate their perceptions after completing the treatment (Pratt, McGuigan, & Katzev, 2000). The next 10 statements pertained to their reactions to the online course format and satisfaction. The second instrument evaluated the third level, behavior change, using a mixed methods approach. The first 21 statements regarded whether the participants have seen a change in their own leadership competencies and how often they use the competencies developed from the program. Several open-ended questions solicited more detailed input from respondents.

Table 2

*Characteristics of Participants*

<table>
<thead>
<tr>
<th>Years working in Extension</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5 years</td>
<td>8</td>
<td>47%</td>
</tr>
<tr>
<td>6-10 years</td>
<td>3</td>
<td>18%</td>
</tr>
<tr>
<td>11-15 years</td>
<td>2</td>
<td>12%</td>
</tr>
<tr>
<td>16 years or more</td>
<td>4</td>
<td>23%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years serving as a County Extension Director</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5 years</td>
<td>14</td>
<td>82%</td>
</tr>
<tr>
<td>6-10 years</td>
<td>2</td>
<td>12%</td>
</tr>
<tr>
<td>11-15 years</td>
<td>1</td>
<td>6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Held a leadership position prior to joining Extension</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>13</td>
<td>77%</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>23%</td>
</tr>
</tbody>
</table>

An expert panel was used to establish the instrument’s face and content validity. The selected experts were chosen based on proficiency in program evaluation and leadership development. Following the completed program evaluation, the researchers calculated post-hoc reliability for each level of evaluation using Cronbach’s alpha. Level one had a Cronbach’s alpha of 0.87, level 2 had a Cronbach’s alpha of 0.94, and level three had a Cronbach’s alpha of 0.87. All three levels of evaluation were deemed reliable as all were above the 0.70 alpha level as noted by Cronbach (1971).
Using SPSS 24.0, data were analyzed using descriptive and inferential statistics for the first instrument and part of the second instrument to analyze the Likert-type scale statements. The constant comparative method (Merriam, 1998) was used to reduce data from the open-ended questions into identifiable, recurring themes (Lincoln & Guba, 1985). An audit trail was maintained throughout the data analysis, while direct quotes from respondents were used to create a thick description of the findings. Bias from the researchers can affect the way qualitative data is analyzed and interpreted. For the study reported here, one of the researchers is a state specialist with prior experience in Extension. The other two researchers are state specialists with expertise in leadership development. Previous face-to-face leadership trainings had been offered to the Extension population by two of the three researchers over the past two years, as part of their extension appointment.

The researchers followed the Tailored Design Method (TDM) by Dillman, Smyth, and Christian (2009). The TDM is described as “using multiple motivational features in compatible and mutually supportive ways to encourage high quantity and quality response to the surveyor’s request” and yields high response rates, reduces sampling error, develops trust with the respondents, and allows the researcher to follow survey procedures that are scientifically founded (Dillman et al., 2009, p. 16). IRB approval was received prior to executing the program. Qualtrics was the mode of delivery chosen for the online questionnaires. The advantages to using an online survey for this study were low cost, anonymity, quick response time, and ease of distribution and submission (Ary, Jacobs, Razavieh, & Sorensen, 2006; Dillman et al., 2009). The first survey, which was sent one week after the program ended, yielded a response rate of 100% (n = 17). The second survey, which was sent 6 months after the program ended, yielded a response rate of 88% (n = 15).

Findings

Level One Results

Respondents indicated a high level of satisfaction with the online-delivery format (see Table 3). Participants indicated their highest level of satisfaction with the communication from the instructor (M = 4.76, SD = 0.44) and engagement of the instructor (M = 4.71, SD = 0.47). Reichheld (2003) suggests that one of the most significant measures of satisfaction and growth can be measured by a “would recommend” question. As Reichheld suggests, “By asking this one question, you collect simple and timely data that correlate with growth. You also get responses you can easily interpret and communicate” (2003, p. 1). The participants reported they would participate in a similar type of training program in the future (M = 4.53, SD = .87) and recommend this program to a colleague (M = 4.71, SD = .59) (see Table 4).
Table 3

*Participants’ Satisfaction of the Leadership Short Course*

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall course satisfaction</td>
<td>4.41</td>
<td>.62</td>
</tr>
<tr>
<td>Organization of online modules</td>
<td>4.41</td>
<td>.71</td>
</tr>
<tr>
<td>Navigation of online modules</td>
<td>4.29</td>
<td>.85</td>
</tr>
<tr>
<td>Engagement of the online modules</td>
<td>4.47</td>
<td>.51</td>
</tr>
<tr>
<td>Content of online modules</td>
<td>4.35</td>
<td>.49</td>
</tr>
<tr>
<td>Flexibility of the course</td>
<td>4.41</td>
<td>.80</td>
</tr>
<tr>
<td>Course deadlines</td>
<td>4.13</td>
<td>.81</td>
</tr>
<tr>
<td>Course work (assignments)</td>
<td>4.00</td>
<td>.71</td>
</tr>
<tr>
<td>Engagement of the instructor</td>
<td>4.71</td>
<td>.47</td>
</tr>
<tr>
<td>Communication from the instructor</td>
<td>4.76</td>
<td>.44</td>
</tr>
</tbody>
</table>

*Note.* Respondents were asked to rate their level of satisfaction about the course on a Likert-type scale (1 = *Very dissatisfied*, 2 = *Dissatisfied*, 3 = *Neither satisfied nor dissatisfied*, 4 = *Satisfied*, 5 = *Very satisfied*).

Table 4

*Participation in Future Online-Delivered Programs and Recommendations to Colleagues*

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would participate in training programs like this one in the future</td>
<td>4.53</td>
<td>.87</td>
</tr>
<tr>
<td>I would recommend this program to my colleagues</td>
<td>4.71</td>
<td>.59</td>
</tr>
</tbody>
</table>

*Note.* Respondents were asked to rate their level of agreement with the above statements on a Likert-type scale (1 = *Strongly disagree*, 2 = *Disagree*, 3 = *Neither agree nor disagree*, 4 = *Agree*, 5 = *Strongly agree*).

**Level Two Results**

Respondents indicated significant changes in many of their leadership skills after completing the Leadership Short Course (see Table 5). Fifteen of the seventeen leadership skills were statistically significant. The four leadership skills to exceed Cohen’s (1988) convention for a large effect were understanding the importance perceptions play in leadership development, \( t (16) = 4.66, p < 0.05, d = 1.13 \), understanding the role environment plays in leadership, \( t (16) = 3.66, p < 0.05, d = 0.91 \), recognizing the importance of experience on both perception and leadership, \( t (16) = 3.50, p < 0.05, d = 0.85 \), and recognizing the different frames of organizational perspective, \( t (16) = 3.45, p < 0.05, d = 0.84 \).
Table 5

Paired Means and Statistical Significance of Leadership Skills

<table>
<thead>
<tr>
<th>Leadership Skills</th>
<th>Before</th>
<th></th>
<th>After</th>
<th></th>
<th>t</th>
<th>p</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understand the importance perceptions play in leadership</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>development</td>
<td>3.47</td>
<td>.72</td>
<td>4.35</td>
<td>.70</td>
<td>4.66</td>
<td>.00</td>
<td>1.13</td>
</tr>
<tr>
<td>Recognize the role purpose plays in leading others</td>
<td>3.59</td>
<td>.62</td>
<td>4.12</td>
<td>.70</td>
<td>2.30</td>
<td>.03</td>
<td>0.56</td>
</tr>
<tr>
<td>Recognize the importance of experience on both perception</td>
<td>3.53</td>
<td>.72</td>
<td>4.06</td>
<td>.66</td>
<td>3.50</td>
<td>.01</td>
<td>0.85</td>
</tr>
<tr>
<td>and leadership</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify the difference between primary and secondary</td>
<td>3.24</td>
<td>.97</td>
<td>3.71</td>
<td>.99</td>
<td>2.22</td>
<td>.04</td>
<td>0.54</td>
</tr>
<tr>
<td>dimensions of diversity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compare and contrast your</td>
<td>3.59</td>
<td>1.07</td>
<td>4.53</td>
<td>.62</td>
<td>3.11</td>
<td>.01</td>
<td>0.75</td>
</tr>
<tr>
<td>personality type to others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify my overconfidence and optimism bias</td>
<td>3.25</td>
<td>.86</td>
<td>3.69</td>
<td>.95</td>
<td>1.39</td>
<td>.19</td>
<td>0.35</td>
</tr>
<tr>
<td>Recognize factors associated with</td>
<td>3.71</td>
<td>.92</td>
<td>4.24</td>
<td>.83</td>
<td>2.31</td>
<td>.03</td>
<td>0.56</td>
</tr>
<tr>
<td>effective communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recognize the different dimensions of emotional intelligence</td>
<td>3.18</td>
<td>.11</td>
<td>3.82</td>
<td>.95</td>
<td>2.40</td>
<td>.03</td>
<td>0.58</td>
</tr>
<tr>
<td>Utilize different approaches to conflict resolution</td>
<td>3.06</td>
<td>.93</td>
<td>3.94</td>
<td>.68</td>
<td>3.05</td>
<td>.01</td>
<td>0.76</td>
</tr>
<tr>
<td>Understand the role environment plays in leadership</td>
<td>3.31</td>
<td>.70</td>
<td>4.19</td>
<td>.83</td>
<td>3.66</td>
<td>.00</td>
<td>0.91</td>
</tr>
<tr>
<td>Recognize the different frames of organizational perspective</td>
<td>2.71</td>
<td>.99</td>
<td>3.59</td>
<td>1.00</td>
<td>3.45</td>
<td>.01</td>
<td>0.84</td>
</tr>
<tr>
<td>Identify costs and benefits to conflict in organizations</td>
<td>3.18</td>
<td>.95</td>
<td>3.94</td>
<td>.43</td>
<td>2.62</td>
<td>.02</td>
<td>0.64</td>
</tr>
<tr>
<td>Analyze the barriers to change in organizations due to</td>
<td>2.88</td>
<td>1.05</td>
<td>3.82</td>
<td>.53</td>
<td>3.11</td>
<td>.01</td>
<td>0.75</td>
</tr>
<tr>
<td>particular organizational frames</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recognize factors associated with</td>
<td>3.65</td>
<td>.79</td>
<td>4.06</td>
<td>.56</td>
<td>1.60</td>
<td>.13</td>
<td>0.39</td>
</tr>
<tr>
<td>effective email communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understand the importance of</td>
<td>4.12</td>
<td>.78</td>
<td>4.59</td>
<td>.62</td>
<td>2.06</td>
<td>.06</td>
<td>0.49</td>
</tr>
<tr>
<td>recognizing others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5 (continued)
**Paired Means and Statistical Significance of Leadership Skills**

<table>
<thead>
<tr>
<th>Leadership Skills</th>
<th>Before</th>
<th>After</th>
<th>t</th>
<th>p</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify elements of building an effective team</td>
<td>3.53, .72</td>
<td>4.24, .67</td>
<td>2.95</td>
<td>.01</td>
<td>0.72</td>
</tr>
<tr>
<td>Recognize the different steps to running an effective meeting</td>
<td>3.59, .80</td>
<td>4.18, .64</td>
<td>2.58</td>
<td>.02</td>
<td>0.63</td>
</tr>
</tbody>
</table>

*Note.* Respondents were asked to rate their knowledge level of leadership concepts and ability to apply them before and after participating in the Leadership Short Course on a Likert-type scale: (1 = *Very low*, 2 = *Low*, 3 = *Average*, 4 = *High*, 5 = *Very high*).

**Level Three Results**

Overall, respondents reported moderate to high levels of behavior change from their participation in the Leadership Short Course (see Table 6). The highest levels of behavior changes reported were their perception of their leadership role ($M = 3.20, SD = 1.03$), providing feedback ($M = 3.17, SD = 1.03$), paying attention to different personality types ($M = 3.07, SD = 0.92$), placing importance on understanding and appreciating differences ($M = 3.00, SD = 1.00$), and cultivating creativity ($M = 3.00, SD = 1.29$).

Table 6

**CED Behavior Changes Six Months after Completion of Leadership Short Course**

<table>
<thead>
<tr>
<th>Behavior</th>
<th>$M$</th>
<th>$SD$</th>
<th>$N$</th>
</tr>
</thead>
<tbody>
<tr>
<td>The perception I have of my leadership role</td>
<td>2.36</td>
<td>0.81</td>
<td>11</td>
</tr>
<tr>
<td>The priority I place on leadership related activities</td>
<td>2.58</td>
<td>1.08</td>
<td>12</td>
</tr>
<tr>
<td>The amount of time I take to coach others</td>
<td>3.20</td>
<td>1.03</td>
<td>10</td>
</tr>
<tr>
<td>The importance I place on understanding and appreciating differences</td>
<td>3.00</td>
<td>1.00</td>
<td>13</td>
</tr>
<tr>
<td>The attention I pay to different personality styles in leading others</td>
<td>3.07</td>
<td>0.92</td>
<td>14</td>
</tr>
<tr>
<td>Being aware of my overconfidence or over optimism</td>
<td>2.27</td>
<td>1.01</td>
<td>11</td>
</tr>
<tr>
<td>Am more emotionally in control of thoughts and actions</td>
<td>2.27</td>
<td>0.79</td>
<td>11</td>
</tr>
<tr>
<td>Handle conflict more effectively</td>
<td>2.29</td>
<td>0.76</td>
<td>7</td>
</tr>
<tr>
<td>Better understand the role the environment plays in my leadership effectiveness</td>
<td>2.67</td>
<td>0.86</td>
<td>9</td>
</tr>
<tr>
<td>Use the different frames to help lead more effectively</td>
<td>2.13</td>
<td>1.25</td>
<td>8</td>
</tr>
</tbody>
</table>
**CED Behavior Changes Six Months after Completion of Leadership Short Course**

<table>
<thead>
<tr>
<th>Behavior Description</th>
<th>M</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask for conflicting ideas to get to better solutions</td>
<td>2.63</td>
<td>1.19</td>
<td>8</td>
</tr>
<tr>
<td>Use critical thinking (including the frames) to address problems in the organization</td>
<td>2.89</td>
<td>1.17</td>
<td>9</td>
</tr>
<tr>
<td>Write more effective emails</td>
<td>2.50</td>
<td>1.00</td>
<td>12</td>
</tr>
<tr>
<td>Communicate with others more effectively</td>
<td>2.58</td>
<td>0.90</td>
<td>12</td>
</tr>
<tr>
<td>Work with teams more effectively</td>
<td>2.58</td>
<td>1.08</td>
<td>12</td>
</tr>
<tr>
<td>Run more effective meetings</td>
<td>2.64</td>
<td>1.12</td>
<td>11</td>
</tr>
<tr>
<td>Cultivate creativity</td>
<td>3.00</td>
<td>1.29</td>
<td>7</td>
</tr>
<tr>
<td>Encourage psychological safety</td>
<td>2.89</td>
<td>1.05</td>
<td>9</td>
</tr>
<tr>
<td>Provide feedback to others</td>
<td>3.17</td>
<td>1.03</td>
<td>12</td>
</tr>
<tr>
<td>Provide recognition</td>
<td>2.85</td>
<td>0.98</td>
<td>13</td>
</tr>
<tr>
<td>Work on particular leadership competencies</td>
<td>2.75</td>
<td>0.97</td>
<td>12</td>
</tr>
</tbody>
</table>

*Note. Respondents were asked to rate the degree to which their behavior has changed due to their participation in the Leadership Short Course on a Likert-type scale (1 = *Not at all*, 2 = *A moderate amount*, 3 = *A lot*, 4 = *A great deal*).*

Respondents were asked what had been the biggest difference with their ability to lead as a result from their participation in the Leadership Short Course. Ninety-three percent (*n* = 14) of respondents provided an explanation. Increased confidence (*n* = 3) and communication (*n* = 3) were common themes reported, such as “less trepidation to assume a leadership role in my office and with colleagues” and “listening to staff concerns, prioritizing, and making decisions for the greater good of the department”. Another respondent stated, “my willingness to accept different opinions and different ways of doing things; using the differences to make better decisions for the entire office”.

Finally, respondents were asked if their confidence level had changed due to their participation in the Leadership Short Course. Eighty-seven percent (*n* = 13) of respondents reported a change in their confidence to lead. When prompted to describe in what ways their confidence changed, respondents replied “I feel that I am paying better attention to others, so when I make a decision, it is more applicable to everyone” and “I feel more comfortable and take the time to let people know I appreciate them”. Another respondent stated, “I feel more confident in communicating now that I know the communication preferences of my team members. Knowing this info allows me to tailor my message to my audience”.

**Conclusions**

It is critically important to find innovative ways to deliver and develop the skills and behaviors of County Extension Directors in the area of leadership. Though there are leadership development programs, which assume this responsibility, the research on the success of these programs is scarce. This paper is the first to look at the design and evaluation of a primarily online CED leadership program. The Kirkpatrick model (1976) of program evaluation was used to better understand the impact the program had on participants.
Kirkpatrick’s first level measures participant satisfaction with the different course components. Overall, the participant were satisfied in all areas evaluated. The highest level of satisfaction from participants were in the areas of engagement with instructor and communication from instructor. In face-to-face training, the variability that could emerge based on the particular instructor would be concerning. However, one of the strengths of an online format is that most engagement and communication was made using videos, emails and postings, which can be replicated in all future courses guaranteeing consistency.

The high level of engagement in the class also likely impacted other ratings of satisfaction. Although the participants’ responses were still in the satisfied range, the participants rated course work/assignments and course deadlines as the two lowest levels of participant satisfaction. Based on the qualitative responses, this was related to the short time frame the participants had to complete assignments rather than the difficulty or dissatisfaction with the assignments. However, these findings are inconsistent with participant’s views concerning the length of time for program delivery. The current program utilized a three-month timeframe to deliver course content via online and face-to-face following Jayaratne et al.’s (2010) recommendation for limiting leadership development programs to less than four months. When asked about whether the course should be kept the same length, shortened, or increased, 59% \((n = 10)\) of respondents reported the program length was satisfactory. Twenty-nine percent \((n = 5)\) reported shortening the course length, and 12% \((n = 2)\) recommended increasing the program length.

Participants in the Leadership Short Course reported a high likelihood they would recommend the program to colleagues. Since the program is still in its infancy, the recommendations from these early adopters will be critically important to the recruitment success of future cohorts. Additionally, participants in the program suggested they would be likely to participate in a program like this in the future. This may have implications on additional leadership training opportunities and CED training in general. Finally, both of these quantitative results can be used to provide stakeholders with both satisfaction data on the course and the likelihood additional cohorts could be recruited using participant recommendations (Reichheld, 2003).

A retrospective pretest and a traditional posttest was used to measure the change in attitudes, knowledge, and skills learned by the participants of the Leadership Short Course. There was a significant increase in fourteen of the seventeen statements measuring perceived participant learning throughout the program. The learning that occurred during the program was the first step to transferring the competencies back into the work environment (Kirkpatrick & Kirkpatrick, 2016). Although seventy-seven percent of the participants held a leadership position prior to joining Extension, the learning of new perspectives and leadership tools could have aided the CEDs in feeling more confident, which was reported as a behavior change in the six-month behavior change survey.

The third level of evaluation that was completed addressed the changes to the CEDs behavior six months after the leadership program was completed. Based on the findings of the six-month post survey, it is evident the leadership development program had an impact on CED leadership behavior. All of the 21 behavior changes that were measured displayed significant increases from respondents. The strongest impact can be seen in the CED behavior of coaching and providing feedback, indicating the program is having an impact on both the behaviors of the CEDs and also the Extension agents they supervise. The majority of respondents also indicated they saw an increase in their confidence to lead, and their communication styles changed according to which styles their team members prefer, both of which were identified by both Owen (2004) and Sanders (2014) as important competencies for CEDs to possess.
When comparing the level two learning outcomes to the level three behavior changes, differences emerged among two of the evaluation statements. First, *identify my overconfidence and optimism bias* was rated low from both levels two and three, providing important feedback about this particular section of the course. Moving forward, this section will need to be revised for both initial learning and post-training transfer. Second, *recognize the different frames of organizational perspective* was rated high \((M = 3.59)\) in the post training learning evaluation but these tools did not transfer into new behaviors on the job. This will also need to be re-evaluated and more focus should be placed on helping participants take what they have learned and apply it to their leadership opportunities.

**Implications and Recommendations**

The study explores the impact of an online leadership program on Florida CEDs’ satisfaction, learning, and behavior change. The results suggest three major implications for extension, online leadership development, and program evaluation. As Sondgerath (2016) suggests, “With Cooperative Extension budgets shrinking at federal, state, and local levels, it is incumbent on state Extension systems to explore innovative ways of delivering professional development content as efficiently as possible while still providing content relevant to field educator/agent needs.” The first implication of this study is that online leadership programs can provide an innovative way to address the leadership developmental needs of CEDs, while also providing increased flexibility in participation and cost savings associated with travel expenses.

A second implication of the current study is the contribution it makes to the body of research pertaining to online leadership development program evaluation. The research provides a template to measure outcomes associated with participant satisfaction, learning, and behavior changes. This research also contributes to the scarce literature on Kirkpatrick’s third level of evaluation, addressing CED behavior change six months after the online leadership program concluded. With this said, this study also provides valuable insight into level two and three outcomes, which need to be adapted in order to demonstrate better increases in specific sections.

The final implication of this current study includes the overall satisfaction, learning and behavior change results of the program. The day-to-day leadership responsibilities of a CED, along with the changing landscape of Extension, have presented new leadership challenges for CEDs to overcome (Sanders, 2014). Previous research suggests that very few Extension leaders have the leadership competence appropriate for today’s Extension organization (Sanders, 2014). Additionally, “several studies have shown that Extension professionals perceive their own management abilities as deficient,” which can have a negative impact on leader self-confidence (Sondgerath, 2016). The online Leadership Short course demonstrates results that address CED satisfaction with the training, perceived learning to impact leader self-confidence, and actual behavior change on different leadership competencies.

As Extension explores the option of online leadership development, there are also a few recommendations that should be considered when conducting future research on CED online leadership development programs. First, more research is needed examining online leadership development programs, specifically observing different program structures and in other contexts. The current research is limited due to the participants studied being CEDs from a single state’s Extension system. The second recommendation is to examine the impact these programs have on those who are supervised by CEDs. With the program encouraging the most significant changes in coaching and feedback, it would seem the program also had an impact on the Extension agents supervised by the course participants; however, the course evaluations did not include this audience. Future course evaluations should include an instrument for supervisees to measure
perceived changes to program participant behaviors related to key leadership skills addressed in the online program. The third recommendation is to explore the impact the online program had on the UF/IFAS Extension system, which is also the criteria for level four evaluation under Kirkpatrick’s model (1976).

References


Identifying Generational Differences to Target Extension Programming when Discussing Genetic Modification

Peyton N. Beattie1, Alexa J. Lamm2, Joy N. Rumble3, & Jason D. Ellis4

Abstract

Genetic modification (GM) science has received considerable pushback from consumers despite the research finding GM products are safe for consumption. This may be partly due to the disconnect between consumers and farms since most consumers are disconnected from the farm by at least three generations. The largest consumer population is composed of millennials, which is the generation furthest removed from the farm which may mean they need to be educated differently about GM science than other generations. The purpose of this research was to determine if there were generational differences regarding the perceived attributes of GM science to inform the development of extension programs designed to educate consumers about GM science. A survey was used to collect consumers’ perceptions of GM science. The respondents were grouped into generational classifications and perceptions between groups were compared. The findings revealed generations do perceived GM science differently and extension programs should be designed for specific generational audiences.

Keywords: generational differences; Extension; genetic modification

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Introduction

The topic of genetic modification (GM) science has become one of much controversy stemming from consumer perceptions that GM food products are a cause for concern despite research findings supporting their safety (Mahgoub, 2016). Consumers often develop their perceptions emotionally, due largely to biased media reporting rather than from an educated, informed perspective (Mahgoub, 2016). It has been hypothesized that consumers’ lack information about agriculture is impacting their decision-making because, on average, most consumers are disconnected from farming or agriculture by three generations (American Farm Bureau Federation, 2017). Recent research highlighted the farm to consumer disconnect with research findings indicating consumers in major citrus producing states (Florida, California, and Texas) reported regularly purchasing citrus but over half of those consumers did not believe their community’s

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economy was dependent upon the citrus industry (Ruth, Beattie, Lamm & Rumble, 2017). Therefore, an opportunity exists for Extension agents to take GM science research conducted at land grant universities, translate it into understandable information, and disseminate it to their local communities in order for the public to be better informed when purchasing food.

The consumer population is largely composed of millennials (Hais & Winograd, 2011); the generation farthest removed from production agriculture (Fyksen, 2017). Millennials have the largest purchasing power (Hais & Winograd, 2011) but are not the only consumers involved in the purchasing and consumption of food. Baby boomers, generation Xers, and traditionalists are also a part of the education, decision-making, and food purchasing equation. There is a need to decrease the farm to consumer gap through educational programming so consumers can make informed food purchasing decisions (King, Tietyen, & Vickner, n.d.). Extension agents will be more effective at developing effective consumer programs targeted toward specific generational groups if they understand how different generations perceive GM attributes. This research aligns with the American Association of Agricultural Education (AAAE) National Research Agenda priority five, developing ways to better communicate with diverse audiences (Thoron, Myers, & Barrick, 2016) by better understanding generations as audiences and also addresses the complex problem of public acceptance of GM food which aligns with research priority seven of the AAAE National Research Agenda (Andenoro, Baker, Stedman, & Weeks, 2016).

Generations are groups of individuals, in this case consumers, that are classified by the events, trends, and changes that occurred in the time-period of their birth year (The Center for Generational Kinetics, 2016). Trends that are responsible for forming the identity of generational groups are parents, technology, and economics (The Center for Generational Kinetics, 2016). Millennials were born between the years 1981 and 2000 (The Center for Generational Kinetics, 2016) and constitute 30% of the adult population (Pew Research Center, 2015). Although millennials are the youngest generations among the adult population, they are on the fast track to becoming the United State’s “largest living generation” and will soon be the force “driving changes” around the types of foods consumers purchase (Duff & Phelps Corporation, 2016, p. 6). Millennials depend on the opinions of others and outside sources to guide their purchasing decisions and are expected to struggle with financial management (U. S. News and World Report, 2014).

Generation Xers were born between the years 1965 and 1980 (The Center for Generational Kinetics, 2016) and are responsible for 27% of the adult population (Pew Research Center, 2015). Generation Xers are the informed generation. The development of the internet and other technologies occurred during this generation. Their increased access to information has made them the most involved generation in researching products before purchasing (Williams, n.d.).

Baby Boomers were born between the years 1946 and 1964 (The Center for Generational Kinetics, 2016) and make up 30% of the adult population (Pew Research Center, 2015). The Baby Boomer generation tends to be brand loyal, informed, and financially stable (U. S. News & World Report, 2015). Traditionalists were born prior to the year 1945 (The Center for Generational Kinetics, 2016) and only constitute 11% of the population (Pew Research Center, 2015). Traditionalists are traditional in their values, hesitate to change, and are consistent in their brand devotion (Williams & Page, 2013).

**Theoretical Framework**

Rogers’ (2003) diffusion of innovations theory guided the framework of this study. Diffusion of innovations theory describes the process in which a new idea is diffused through a
social system (Rogers, 2003). More specifically the process includes “(1) an innovation (2) [being] communicated through certain channels (3) over time (4) among the members of a social system” (Rogers, 2003, p. 11). An innovation is recognized as any idea, technological advancement, or product that is perceived as new to an individual or unit. Communication channels are the space where those who are familiar with the innovation communicate with the less familiar to generate an understanding of the innovation. Time is the variable in which the decision to adopt or reject the innovation is formulated. The social system where the innovation is diffused acts as a constraint in norms, belief, views, etc. and ultimately effects the individual or unit’s decision to adopt or reject an innovation (Rogers, 2003).

Rogers (2003) identified five attributes of an innovation that should impact rate of adoption: relative advantage, compatibility, complexity, observability, and trialability. Relative advantage is the idea that the innovation possesses characteristics that are perceived to be advantageous as compared to the characteristics of the idea, product, or technology being replaced (Rogers, 2003). Compatibility is defined as how closely the innovation aligns with “existing values, past experiences, and needs” (Rogers, 2003, p. 240). The complexity of an innovation includes the difficulty level and level of knowledge needed to successfully use the innovation (Rogers, 2003). The observability of an innovation is described as how visible the innovation is to the people in the social system in which the innovation is being diffused (Rogers, 2003). Finally, trialability is the ability to sample the innovation before engaging in adoption or rejection of the innovation (Rogers, 2003). The degree to which each of these five attributes are experienced with the innovation builds the positive or negative perception of the innovation by the individual or unit in the social system in which the innovation was diffused (Rogers, 2003).

Previous research has been conducted examining generational differences in the adoption of new technologies. Blackburn (2011) found millennials bring large amounts of expertise in technological advancements to the learning environment (in this case a library) which, in turn, positively impacts efficiency. Blackburn (2011) suggested libraries should consider a millennial workforce due to their level of technology knowledge that could assist with the adoption of new technologies.

Quan-Haase, Martin, and Schreurs (2014) conducted a study of the traditionalist generation and their adoption of e-book technology. They found most of their research participants were aware of e-book technology but had yet to make a decision to adopt or reject the innovation (Quan-Haase et al., 2014). Three factors were found that hindered traditionalist’s adoption of e-books: the e-books lacked the physical book and print aspect, the e-book innovation lacked the trialability attribute, and traditionalists lacked confidence to navigate a new technology.

A study conducted by Gafni and Geri (2013) discussed Generation X’s use of smartphones and the adoption of the internet capabilities on the smartphones as compared to Generation Y or millennials. The results indicated that Generation Xers have been more likely to use smartphones in the last 12 years, compared to a 25-year time span. However, progression of time did not increase the likelihood of Generation Xers using the internet capabilities on their smartphones. Therefore, this study indicated that Generation Xers were slower in their adoption of technology and have not fully adopted all of the capabilities of the technology as compared to Generation Y or millennials (Gafni & Geri, 2013).

Rumble et al. (2016) conducted a study of millennial’s perceptions of GM science and their likelihood to adopt GM citrus products. The study indicated that 56.1% millennial respondents would be likely or extremely likely to consume GM citrus products. The study also indicated that
the compatibility attribute of an innovation was a predictor of their likelihood to consume GM citrus products (Rumble et al., 2016).

**Purpose and Objectives**

The purpose of this study was to determine if generational differences existed in the perceived adoption characteristics of GM science. This study was conducted to inform the development of extension programs focused on educating about GM science to a variety of generational audiences. The purpose was addressed through the following objectives:

1. Describe the perceived relative advantage, compatibility, complexity, observability, and trialability of GM science within each generation; and
2. Determine if there are statistical differences between the perceived attributes of GM science by generation.

**Methods**

The research shared here is part of a larger study designed to understand U.S. consumer perceptions of GM science. An online survey was developed and reviewed by a panel of experts. The survey was pilot tested with slight revisions made to ensure internal and external validity and reliability of the constructs. Responses were collected using non-probability, opt-in sampling techniques (Baker et al., 2013). U.S. residents ages 18 and older were invited to participate in the online survey. Of the 1,751 invited to participate, 1,047 completed responses were returned after quota sampling and attention filters were met which accounts for a 60% usable response rate. The survey data was weighted to reflect the 2010 U.S. Census data to increase generalizability of the results to U.S. consumers (Baker et al., 2013).

First, survey respondents were asked to indicate the year in which they were born. The years reported by the respondents were then recoded into generational categories: 1981-2000 = Millennials, 1965-1980 = Generation X, 1946-1964 = Baby Boomers, before-1945 = Traditionalist (The Center for Generational Kinetics, 2016). Perceptions of the five attributes of GM science were then measured using respondent reactions to a series of statements for each attribute.

Perceived relative advantage was measured using a five-point Likert type scale. Respondents were asked to indicate their level of agreement or disagreement to the following statements: GM science enhances the taste of food, GM science increases the amount of food a farmer can grow, GM science reduces the use of pesticides, GM science combats plant disease, GM science makes food more affordable, GM science enables plants to grow when less water is available, GM science is part of a solution to end world hunger, and GM science fosters more opportunities for the next generation. The responses to the eight statements were averaged to create a relative advantage index. Reliability was measured post hoc ($\alpha = .92$).

Consumers’ perceived compatibility was measured using a five-point Likert type scale. Respondents were asked to indicate their level of agreement or disagreement with the following statements as they pertain to GM science: developments in GM science help make society better, GM science is essential for improving the quality of human lives, GM science does not pay attention to the moral of society, GM science makes out way of life change too fast, even if it brings no immediate benefit GM science that advances knowledge is necessary, and overall GM science does more harm than good. The responses to the six statements were averaged to create a compatibility index. Reliability was measured post hoc ($\alpha = .74$)
Perceived complexity was measured using a semantic differential scale. Survey respondents were asked to select the circle between each set of adjectives that best represents their thoughts about GM science. The sets of adjectives included: complex/simple, easy to understand/difficult to understand, clear/unclear, confusing/straightforward, ambiguous/definitive, and complicated/not complicated. The responses to the six sets of adjectives were averaged to create a complexity index. Reliability was measured post hoc ($\alpha = .83$).

Consumers’ perceived observability was measured using a semantic differential scale. Respondents were asked to select the circle between each set of adjectives that best represents their thoughts about GM science. The sets of adjectives included: easy to identify/difficult to identify, something I can observe/something I cannot observe, obvious/not obvious, evident/concealed, visible/invisible, and disclosed/withheld. The responses to the six sets of adjectives were averaged to create an observability index. Reliability was measured post hoc ($\alpha = .92$).

Lastly, perceived trialability was measured using a five-point Likert type scale. Respondents were asked to indicate their level of agreement or disagreement with the following statements as they pertain to GM science: food products that result from plants made with GM science are easy to try, food products that result from plants made with GM science are readily available to test before I buy, I can easily try food products that result from plants made with GM science in a grocery store, the opportunity to try food products that result from plants made with GM science is not available to me, if given the opportunity I would try food products that result from plants made with GM science, and I want the opportunity to try out food products that result from plants made with GM science before deciding whether I like them or not. The statement the opportunity to try food products that result from plants made with GM science is not available to me was removed before creating the trialability construct in order for the construct to be reliable. The remaining five statements were averaged to create a trialability index. Reliability was measured post hoc ($\alpha = .66$).

Mean scores and standard deviations were interpreted using the real limits of the scale: $1.00 - 1.49 =$ strongly disagree, $1.50 - 2.49 =$ disagree, $2.50 - 3.49 =$ neither agree nor disagree, $3.50 - 4.49 =$ agree, $4.50 - 5.00 =$ strongly agree. ANOVAs were used to determine if generational differences existed. Tukey post hoc tests were used to identify specific differences between groups. Effect sizes were calculated to determine the magnitude of the differences between generational groups. Cohen’s (1988) guidelines were used to guide the interpretation of the effect size.

Results

For the most part millennial and generation X respondents were similar in their responses. Respondents in both groups agreed GM science provided a relative advantage and neither agreed nor disagreed GM science was compatible, complex, or observable (see Table 1). Millennials agreed with the trialability of GM science, whereas generation Xers neither agreed nor disagreed on their perceptions of GM science trialability.

Respondents who indicated being in the baby boomer and traditionalist generations were also similar. The baby boomers and traditionalists neither agreed nor disagreed that GM science provided a relative advantage, was compatible, or provided trialability characteristics. The baby boomer and traditionalist generations disagreed GM science is observable. The baby boomers and traditionalists differed in their perceptions of GM science’s complexity. The baby boomers neither agreed nor disagreed it was complex, where the traditionalists disagreed that GM science was complex.
Table 1

Perceived Attributes of GM Science by Generation

<table>
<thead>
<tr>
<th></th>
<th>Millennials ($n = 333$)</th>
<th>Generation X ($n = 295$)</th>
<th>Baby Boomers ($n = 312$)</th>
<th>Traditionalist ($n = 107$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
</tr>
<tr>
<td>Relative Advantage</td>
<td>3.78 (.64)</td>
<td>3.63 (.78)</td>
<td>3.40 (.77)</td>
<td>3.44 (.73)</td>
</tr>
<tr>
<td>Compatibility</td>
<td>3.42 (.59)</td>
<td>3.19 (.71)</td>
<td>3.18 (.79)</td>
<td>3.28 (.77)</td>
</tr>
<tr>
<td>Complexity</td>
<td>2.87 (.76)</td>
<td>2.69 (.81)</td>
<td>2.59 (.77)</td>
<td>2.45 (.65)</td>
</tr>
<tr>
<td>Observability</td>
<td>3.12 (.89)</td>
<td>2.69 (1.00)</td>
<td>2.41 (.94)</td>
<td>2.13 (.72)</td>
</tr>
<tr>
<td>Trialability</td>
<td>3.62 (.63)</td>
<td>3.34 (.70)</td>
<td>3.15 (.64)</td>
<td>3.23 (.54)</td>
</tr>
</tbody>
</table>

Note. Real limits of the scale: 1.00 - 1.49 = strongly disagree, 1.50 - 2.49 = disagree, 2.50 - 3.49 = neither agree nor disagree, 3.50 - 4.49 = agree, 4.50 - 5.00 = strongly agree

ANOVA's were used to determine if statistical differences existed between the generational groups for the five attribute indices (see Table 2). Statistical differences were found for all five of the attributes. The results indicated a small effect size for compatibility and complexity and a medium effect size for relative advantage, trialability, and observability (Cohen, 1988).

Table 2

Differences in Perceived Attributes between Generational Groups

<table>
<thead>
<tr>
<th></th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta_P^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observability</td>
<td>46.73</td>
<td>.00**</td>
<td>.13</td>
</tr>
<tr>
<td>Trialability</td>
<td>30.00</td>
<td>.00**</td>
<td>.09</td>
</tr>
<tr>
<td>Relative Advantage</td>
<td>16.03</td>
<td>.00**</td>
<td>.06</td>
</tr>
<tr>
<td>Complexity</td>
<td>11.59</td>
<td>.00**</td>
<td>.04</td>
</tr>
<tr>
<td>Compatibility</td>
<td>7.92</td>
<td>.00**</td>
<td>.02</td>
</tr>
</tbody>
</table>

Note. **$p < .01$

Tukey post hoc tests were run to determine which specific generational groups had significant differences for each of the five attributes. The differences in the generational groups for the relative advantage attribute are depicted in Table 3. Baby boomers and traditionalists differed significantly from millennials in their perceptions of the relative advantage of GM science. Baby boomers also differed significantly in their perceptions to the generation X group.
Consumers in the generation X and baby boomer generations’ perceptions of the compatibility of GM science differed significantly from the perceptions of the millennial generation (see Table 4). The millennial generation had a higher mean score on their perceptions of compatibility of GM than the traditionalist generation, whereas the traditionalist generation had a higher mean score than the baby boomers and the generations Xers. However, the differences between the traditionalist generation and the other generations was not significant.
Table 4

Tukey Post Hoc Test for Compatibility

<table>
<thead>
<tr>
<th>Generation</th>
<th>Generation Comparison</th>
<th>Mean Difference</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millennials</td>
<td>Generation X</td>
<td>.23</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Baby Boomers</td>
<td>.24</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Traditionalist</td>
<td>.14</td>
<td>.29</td>
</tr>
<tr>
<td>Generation X</td>
<td>Millennials</td>
<td>-.22</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Baby Boomers</td>
<td>.02</td>
<td>.99</td>
</tr>
<tr>
<td></td>
<td>Traditionalist</td>
<td>-.09</td>
<td>.71</td>
</tr>
<tr>
<td>Baby Boomers</td>
<td>Millennials</td>
<td>-.24</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Generation X</td>
<td>-.02</td>
<td>.99</td>
</tr>
<tr>
<td></td>
<td>Traditionalist</td>
<td>-.10</td>
<td>.55</td>
</tr>
<tr>
<td>Traditionalist</td>
<td>Millennials</td>
<td>-.04</td>
<td>.29</td>
</tr>
<tr>
<td></td>
<td>Baby Boomers</td>
<td>.09</td>
<td>.71</td>
</tr>
<tr>
<td></td>
<td>Generation X</td>
<td>.10</td>
<td>.55</td>
</tr>
</tbody>
</table>

Note. **p < .01

The millennial consumers’ perceptions of the complexity of GM science differed significantly from the perceptions of the consumers in the generation X, baby boomer, and traditionalist groups (see Table 5). In addition, millennials’ perceptions had a higher mean score than the other three generation groups. Traditionalists differed significantly in their perceptions of the complexity of GM science from generation Xers.
Table 5

Tukey Post Hoc Test for Complexity

<table>
<thead>
<tr>
<th>Generation</th>
<th>Generation Comparison</th>
<th>Mean Difference</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millennials</td>
<td>Generation X</td>
<td>.18</td>
<td>.02*</td>
</tr>
<tr>
<td></td>
<td>Baby Boomers</td>
<td>.28</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Traditionalist</td>
<td>.43</td>
<td>.00**</td>
</tr>
<tr>
<td>Generation X</td>
<td>Millennials</td>
<td>-.18</td>
<td>.02*</td>
</tr>
<tr>
<td></td>
<td>Baby Boomers</td>
<td>.10</td>
<td>.35</td>
</tr>
<tr>
<td></td>
<td>Traditionalist</td>
<td>.25</td>
<td>.02*</td>
</tr>
<tr>
<td>Baby Boomers</td>
<td>Millennials</td>
<td>-.28</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Generation X</td>
<td>-.10</td>
<td>.35</td>
</tr>
<tr>
<td></td>
<td>Traditionalist</td>
<td>.14</td>
<td>.34</td>
</tr>
<tr>
<td>Traditionalist</td>
<td>Millennials</td>
<td>-.43</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Generation X</td>
<td>-.25</td>
<td>.02*</td>
</tr>
<tr>
<td></td>
<td>Baby Boomers</td>
<td>-.14</td>
<td>.34</td>
</tr>
</tbody>
</table>

Note. **p < .01, *p < .05

The perceptions of the observability of GM science differed significantly in every generation group (see Table 6). Millennials had a higher mean score than generation X, baby boomer, and traditionalist generations. Millennial, generation Xer, and baby boomer consumers had higher mean scores than the traditionalist consumers.
The millennial consumers perceived the trialability of GM science differently than the generation X, baby boomer, and traditionalist generations (see Table 7). The difference was significant, and millennials had a higher mean score compared to the other three generation groups. Generation X differed significantly in their perceptions compared to the baby boomer generation where generation X had the higher mean score.

Table 6

Tukey Post Hoc Test for Observability

<table>
<thead>
<tr>
<th>Generation</th>
<th>Generation Comparison</th>
<th>Mean Difference</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millennials</td>
<td>Generation X</td>
<td>.43</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Baby Boomers</td>
<td>.71</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Traditionalist</td>
<td>.99</td>
<td>.00**</td>
</tr>
<tr>
<td>Generation X</td>
<td>Millennials</td>
<td>-.43</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Baby Boomers</td>
<td>-.28</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Traditionalist</td>
<td>.56</td>
<td>.00**</td>
</tr>
<tr>
<td>Baby Boomers</td>
<td>Millennials</td>
<td>-.71</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Generation X</td>
<td>-.28</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Traditionalist</td>
<td>.28</td>
<td>.03*</td>
</tr>
<tr>
<td>Traditionalist</td>
<td>Millennials</td>
<td>-.99</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Generation X</td>
<td>-.56</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Baby Boomers</td>
<td>-.28</td>
<td>.03*</td>
</tr>
</tbody>
</table>

Note. ** p < .01, * p < .05
Table 7

Tukey Post Hoc Test for Trialability

<table>
<thead>
<tr>
<th>Generation</th>
<th>Generation Comparison</th>
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<td>Baby Boomers</td>
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<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Traditionalist</td>
<td>.39</td>
<td>.00**</td>
</tr>
<tr>
<td>Generation X</td>
<td>Millennials</td>
<td>-.28</td>
<td>.00**</td>
</tr>
<tr>
<td></td>
<td>Baby Boomers</td>
<td>.19</td>
<td>.00**</td>
</tr>
<tr>
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<td>Traditionalist</td>
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<tr>
<td>Baby Boomers</td>
<td>Millennials</td>
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<td>.00**</td>
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<td></td>
<td>Generation X</td>
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<td>Traditionalist</td>
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<tr>
<td>Traditionalist</td>
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<tr>
<td></td>
<td>Baby Boomers</td>
<td>.08</td>
<td>.68</td>
</tr>
</tbody>
</table>

Note. **p < .01

Conclusions

The results indicated generational groups perceived GM science differently, affecting the rate in which the generations may be adopting GM science. Blackburn (2011) indicated the millennial generation is more likely to engage in new technologies and more willing adopt new technologies compared to other generations. The findings from this study confirmed this to a certain degree. In this study millennials did agree GM science provided a relative advantage and trialability, however the millennials were neutral in their perceptions of GM science offering compatibility, reduced complexity, and observability. Generation X perceived GM science similarly to the millennial generation which is in opposition to Blackburn’s findings.

Quan-Haase et al. (2014) found a majority of traditionalists had not adopted e-book technology, some were unaware of the technology and some were aware and chose not to adopt. These finding are partially consistent with the findings of this GM study. Of the four generations, the traditionalist generation disagreed with two attributes of an innovation, complexity and observability. The traditionalists were neutral in their perceptions of GM science in regards to its relative advantage, compatibility, and trialability. Quan-Haase et al. (2014) indicated traditionalist were hesitant to adopt because there was a lack of trialability of the e-book technology. Results of this study indicated the same, as traditionalist were neutral in their perceptions of the trialability of GM products.

Gafni and Geri (2013) found Generation Xers were slower in their adoption of smartphone technologies and did not fully adopt the technologies capabilities as compared to generation Y or millennials. The results of this study are similar. Millennials and generation Xers were most similar
in their perceptions, taking into consideration all four generation groups. However, when comparing millennials and generation Xers, millennials agreed with two attributes and neither agreed nor disagreed with three. Whereas, generation Xers only agreed with one attribute and neither agreed nor disagreed with four attributes.

The study conducted by Rumble et al. (2016) indicated that over half of the millennial respondents would be likely to consume GM food products. The results of this study indicated the millennial generation agreed with the most attributes compared to the other three generation groups. Rumble et al. (2016) indicated that the millennial generation was most likely to consume GM citrus products if the products were compatible. This result differs from the findings of this study which indicated millennials neither agreed nor disagreed GM science was compatible.

Implications and Recommendations

Due to the generational differences in perceptions of GM science, Extension agents should target specific generations when developing educational efforts about GM science. In terms of relative advantage, millennial’s and generation X’s views aligned closely with each other where baby boomers and traditionalists perceived relative advantage similarly. Therefore, when facilitating outreach efforts to educate consumers around GM science’s relative advantages, millennials and generation Xers should be a target audience group and baby boomers and traditionalists should be another target audience group. The millennial and generation X generations had a more positive perception of GM science’s relative advantages, whereas baby boomers and traditionalist were more conservative with their perceptions. With this, Extension agents can provide programming for baby boomers and traditionalists in areas that focus on their perceptions of the relative advantages of GM science. Agents can focus efforts to share with consumers unbiased, university researched information on how products made using GM science can be advantageous in price, health, safety, quality, and efficiency.

Mixing audience groups could help opposing audiences understand both the positive and negative aspects of GM science. Providing a space where a discussion can be facilitated and mediated by an unbiased professional to discuss both sides of the GM science debate can be helpful. Facilitated discussions can include but are not limited to topics such as what stance do you take, what events led you to take this stance, why do you believe your stance is better than the opposing, would you consider eating food from the opposing stance, and what facts would you share about your stance. The discussion could lead both parties to a better and more informed understanding of both sides and lead to educated purchasing decisions.

The results of this study indicated all four generations’ perceptions of both compatibility and trialability of GM science were similar, implying members of all four generations can be grouped together when outreach efforts target the compatibility of GM science. Because perceptions across all generational groups are similar for the compatibility of GM science, Extension agents should be diligent in providing outreach materials that capture positive and negative features of GM science. Creating opportunities for consumers to experience or try GM science-related items can be presented in the form of field days to talk with farmers that grow GM crops, opportunities to speak with scientists, and chances to try GM and non-GM food products.

Traditionalists viewed the complexity of GM science more negatively than the other generations. However, millennials viewed the complexity of GM science differently than those from other generations. There were also differences in the views of generation Xers and traditionalist. The findings imply that when carrying out outreach in the space of complexity of GM science, millennials should be targeted as a group of their own, and baby boomers and
traditionalist can be a segmented audience. Complexity can be addressed by Extension agents as it pertains to each generation group. Assessing the needs of each group in terms of what they find complex about GM science will help Extension agents provide appropriate programming for the segmented audience. Points of complexity could include lack of knowledge, misinformation, lack of resources, or miscommunication.

Millennials and generation Xers perceived the observability of GM science similarly, as well as, baby boomers and traditionalists. Outreach efforts around the observability of GM science should be targeted toward the groups reflective of their similar perceptions. Ensuring that the segmented audiences are educated on both sides of the GM science story will help consumers develop a well-rounded level of knowledge of GM science and be able to make educated decisions about whether they accept or reject GM science as an innovation. In an effort to make GM science more observable to consumers, social media campaigns can be formed, videos can be composed, and live experiences can be created for consumer to have opportunities to interact with various aspects of GM science. Aspects of GM science can include but are not limited to GM crops, GM science labs, GM food in the grocery store, or other GM products.

Duff and Phelps Corporation (2016) indicated that the millennial generation will have the largest consumer purchasing power. Millennials should largely be the target audience for GM science extension programs because of their predominant stake in the consumer market. In addition to their ability to control changes in purchasing trends (Duff & Phelps Corporation, 2016), millennials are the furthest generation removed from the agriculture industry (American Farm Bureau Federation, 2017). A better understanding of agriculture and the root of their food supply will better educate millennial consumers and guide them in their decision process to accept or reject GM science.

Future research on the generational differences in consumers’ perceptions of GM science is needed to develop appropriate programming to meet consumers where they are in their perceptions. Future studies should be conducted to investigate which specific barriers related to each attribute keep consumers from adopting GM science. Findings of this study can more specifically guide the content of Extension programming. Also, research can be conducted to understand consumer perceptions according to segments other than generations. Other segments that should be investigated include regional location in the US, gender, religion, age, and rural or urban residences, to name a few. Results from this study can help Extension agents provide their specific audience with the content needed to become educated purchasing consumers.

References


Exploring the Effect of Personal Norms and Perceived Cost of Water on Conservation

Amanda D. Ali¹, Cameron N. Ramey² & Laura A. Warner³

Abstract

In recent studies, between 50% to 75% of residential water was used for outdoor irrigation (Milesi et al., 2012). Turfgrass lawns are widely used in outdoor landscapes and are the largest irrigated crop by total area in the United States (Milesi et al., 2005). Consequently, as more American homes utilize turfgrass lawns, outdoor irrigation is expected to increase (Devitt, Carstensen, & Morris, 2008). Increases in outdoor water usage coupled with urbanization pressures water resources and intensifies the need for conservation. This study utilized hierarchical multiple regression to determine factors affecting urban residents’ intent to engage in water conservation. It also evaluated the effect of the Theory of Planned Behavior (TPB) variables on intent to conserve water, then included perceived cost of water and personal norms as additional factors affecting intent to conserve. A total of 1,809 urban residents in the U.S. were surveyed via a researcher-developed questionnaire using non-probability purposive sampling. Findings revealed both social and personal norms had strong effects on intent to conserve water. Recommendations follow that social and personal norms be made known to target audiences and used collectively in extension water conservation programs to promote behavior change.

Keywords: hierarchical regression; perceived cost; personal norms; theory of planned behavior; water conservation

Notes: This work was supported by the University of Florida Institute of Food and Agricultural Sciences Early Career Scientist Seed Fund.

Introduction and Literature Review

Predictions for the year 2050 indicates over 9 billion people on the planet (United Nations, 2009). This figure is an additional 1.4 billion who will join the current 7.4 billion people already putting stress on global food, water, and energy resources (U.S. Census Bureau, 2017). The United Nations Department of Economic and Social Affairs predicts that the 23% of the global population currently residing in cities (with at least 1 million inhabitants) will rise to 27% by 2030 (United Nations, 2016). Rapid urbanization compounded by global population growth will continue to increase water demand, “making it difficult to meet goals for the provision of a safe, affordable, domestic water supply” (Parry, Canziani, Palutikof, Van der Linden, & Hanson, 2007, p. 351). Climate change also has the capacity to upset current water-use systems by altering the quantity, quality, and temperature of global water resources disrupting patterns of demand and availability. For example, New York City’s Department of Environmental Protection considers the “effect of

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climate change on turbidity” (Miller & Yates, 2006, p. 49) a significant concern for the city’s water supply. Increased turbidity levels in primary city reservoirs require substantial treatment and monitoring in order to meet legal quality standards (Parry et al., 2007). The disturbance of New York’s water turbidity is one example of the complex ways in which the influence of climate change, population growth, and urbanization can be measured on local and national scales. Focusing on national trends in water-use can help detangle the complexity of water-related issues by identifying areas where water-use can be reduced.

Consistent with global population growth projections, the U.S. Census Bureau (2017) predicts that the U.S. population will increase from 325 million to almost 417 million by 2060 (Colby & Ortman, 2015). Despite increasing national population growth, the latest study conducted by the U.S. Geological Survey (USGS) found that water withdrawals in the U.S. decreased by 13% between 2005 and 2010 to an estimated 355 billion gallons per day (Maupin et al., 2010). Freshwater withdrawals in 2010 represented one of the lowest total withdrawals in the U.S. prior to 1970. This reduction included categories specific to industrial, domestic, and agricultural use (Maupin et al., 2010). The USGS considers improvements to thermoelectric power-plant technology and the Clean Water Act to be major influences on this trend (Maupin et al., 2010). The USGS noted the decline in freshwater withdrawals specifically for industrial purposes was likely caused by environmental regulation, limited freshwater resources, and a decline in industrial production (including metal, paper, and chemicals) following the 2008 recession (Maupin et al., 2010). Factors such as urbanization, a changing political climate, economic fluctuations, and climate-related environmental variations demonstrate potential to influence national water usage in unprecedented ways. For the purpose of this research, further contextualization of water-use in the U.S. will focus specifically on domestic use (indoor and outdoor residential) including lawn irrigation (Maupin et al, 2010).

While many studies analyzing the correlation between climate related factors and irrigation practices focused on the agricultural industry, fewer attempted to demonstrate the influence of climate-related factors on irrigation practices specific to residential landscapes. Studies that did, reported several significant findings for the influence of climate factors on residential water-use behaviors. A higher average proportion of water-use for outdoor irrigation was measured in regions with arid climates as compared to regions with high precipitation rates (Mayer, 1999). The influence of climate change-related factors adds an additional pressure on the necessity of encouraging water conservation behaviors. Recent studies generally reported the percentage of residential water-use for outdoor irrigation fell between 50% and 75% (Milesi et al., 2012). This finding becomes significant as more American homes install expansive turfgrass lawns, the largest irrigated crop sector in the U.S. by total area (Milesi et al., 2005). Increasing turfgrass area was linked to increasing water usage (Devitt, Carstensen, & Morris, 2008) and is positively correlated with urbanization and suburban development (Robbins & Birkenholtz, 2003). These trends demonstrate the importance of considering how water conservation practices may reduce water consumption for residential lawn irrigation.

In 2015, the state of California implemented pricing mechanisms attempting to encourage water conservation and prevent wasteful water-use due to severe drought conditions (California Environmental Protection Agency, 2016). Executive Order B-29-15 outlined California’s policy for saving water and increasing enforcements against water waste. Policies designed to save water stated, “the State Water Resources Control Board shall impose restrictions to achieve a statewide 25% reduction in potable urban water usage through February 28, 2016…and requires cities and towns to reduce usage as compared to amount used in 2013” (California Executive Department, 2016, p. 2). The Order also issued the Department of Water Resources (DWR) in collaboration with local agencies to “replace 50 million square feet of lawns and ornamental turf with drought
tolerant landscapes” (California Executive Department, 2016, p. 2). Additionally, the DWR was authorized funding for lawn replacement programs to help communities most in need. The DWR prohibited the use of potable water for outdoor irrigation, as well as irrigation for new homes not using a drip or microspray system. A rebate program led by the California Energy Commission was also underway which sought to offer monetary incentives to households to replace inefficient appliances. Policies designed to heighten enforcement against water waste: required urban suppliers to report water usage and conservation every month; increased efficient water systems (e.g. irrigation systems) and prohibited the amount of turfgrass lawns used in the landscape.

In addition to conservation water pricing policies, the International Food Policy Research Institute (IFPRI) predicts future “conservation and technological improvements will lower per capita domestic water-use in developed countries with the highest per capita water consumption,” (Rosegrant, Cai, & Cline, 2002, p. 6) of which the U.S. qualifies. While there are numerous technological improvements to residential irrigation and best use practices, broad adoption of technologies like rain sensors and evapotranspiration controllers (Moore, 2012) is needed to aid in achieving IFPRI’s predicted trend by reducing the pressures of high national turfgrass coverage and water-use associated with residential irrigation (Bremer, 2012; Devitt et al., 2008). Due to substantial variation around the country in information access, financial means, climate, and prevailing attitudes towards the environment, trained Extension professionals are uniquely positioned to facilitate broad adoption of these water-saving technologies and practices (Warner, Lamm, Rumble, Martin, & Cantrell, 2016; Welch & Braunworth, 2010). Despite evidenced importance of water conservation, the public’s lack of knowledge and demonstrated apathy towards water issues continues to hinder water conservation efforts (Devitt et al., 2008; Lamm, Lamm, & Carter, 2015). Many interventions targeting the public promote widespread behavior change as a critical factor in achieving water conservation goals. However, the public remains less informed on water issues than leaders in the agriculture and natural resource fields (Lamm et al., 2015). Alternatively, adequate knowledge of an issue does not directly guarantee a change in behavior, even if the behavior’s benefits are well known.

Several barriers inhibiting the adoption of water conservation behaviors include social norms: if adoption of these behaviors contrasts with the behaviors accepted by the community, and personal norms: if adoption of these behaviors contradict one’s own personal values (Doran & Larson, 2015). For example, studies comparing advanced irrigation systems to manual systems demonstrated a reduction in water consumption by an additional 20% over the control (Devitt et al., 2008). Yet, standard irrigation controllers that require the user to enter the irrigation schedule were found to increase irrigation water volume in comparison to manual irrigation control (Loh & Cochlan, 2003; Syme, Shoa, Po, & Campbell, 2004). This trend is possibly the result of water users valuing time saved over water saved, and the perception that this technology is overly complex, due to the time it takes to manually set the schedule (Salvador, Bautista-Capetillo, & Playán, 2010). However, Syme et al. (2004) interpreted this trend to be a result of user error in setting the timer for extended irrigation periods or at high frequency. Because the impact of these barriers may be hard to distinguish, one might consider addressing both issues together. This can be done by extending education services on proper use of advanced irrigation systems while further investigating the impact of water conservation attitudes on the use of these technologies (Syme et al., 2004). An additional barrier to the adoption of water conservation behaviors is the relatively low cost of water. A study conducted by Salvador et al. (2010) analyzing water-use behaviors of residents in Spain found higher incomes and access to water at a lower cost were factors contributing to over-irrigation of residential lawns. This suggests users may value lawn aesthetics over water conservation, or associate low water cost with plentiful water. Because the low cost of water may hinder some water conservation efforts, Salvador et al. (2010) suggested a “water pricing policy seems to be one of the most important tools for decreasing private landscape irrigation water
use” (p. 303). These results demonstrate the necessity of informed public policy and user education to encourage water-conserving lawn irrigation practices.

In 1948, the U.S. government recognized the need to address water quality and quantity issues on a public policy level passing the Water Pollution Control Act (WPC) as the first regulatory water control policy (Huang & Lamm, 2016). While several regulatory policies were passed after the WPC Act, public involvement was lacking possibly due to insufficient knowledge or lack of personal experience with water issues (Huang & Lamm, 2015). Several studies demonstrated the importance of civic engagement and public policy knowledge in the adoption of water conservation behaviors and supported the expansion of Extension services to address this knowledge gap (Huang & Lamm, 2015). In addition to addressing knowledge gaps, extension programs are proven to substantially improve the adoption of water conservation behaviors. For example, the 40 Gallon Water Challenge is an educational program adopted and implemented by the University of Georgia Center for Urban Agriculture to teach the public about water conservation through voluntary behavior change pledges. As of December 2016, most participants (86%) were committed to their conservation pledges, totaling 1.8 million gallons of water saved per day. One of the most frequent pledges was reducing irrigation run times. The 40 Gallon Challenge is considered a “flexible, easy-to-use water conservation education tool” (Sheffield, Bauske, Pugliese, Kolich, & Boellstorff, 2016, p. 2) effective in encouraging “Extension audiences to adopt indoor and outdoor conservation practices” (p. 2).

Another study conducted in the Chinyanja Triangle of Southern Africa analyzed factors contributing to land, soil, and water conservation practices. The authors found adopters of improved agricultural practices had a 10% advantage in accessing agricultural advice and extension services than did non-adopters (Mango, Makate, Tamenes, Mponela, & Ndengu, 2017). The study concluded that “extension (agricultural advice) remains the main source of information on improved production methods and sustainable agricultural practices in smallholder agriculture” (Mango et al., 2017, p. 127). There is also significant evidence to suggest that extension programs are a worthwhile economic investment in a number of key focus areas. For example, a meta-analysis conducted by IFPRI analyzed all evidence of return in agricultural research and development published since 1953. Findings suggested that the rate of return in economic investment for extension services was 62.9%, just above the accepted normal range of 40%-60% return on agricultural research (Alston, Chang-Kang, Marra, Pardy, & Wyatt, 2000). Collectively, extension services have demonstrated substantial potential to improve public awareness and behavior change, and in several cases, provide the opportunity for positive economic return. With these considerations in mind, broadening extension programs that address residential irrigation may prove beneficial to reducing national domestic water consumption.

Across the U.S., the intersectional issues of population growth, urbanization, and climate change experience greater public awareness. As water users begin to experience the effects of these factors on a personal level, further research may be appropriate to investigate the correlation between public awareness or personal experience with these issues, and adoption of water conservation behaviors. Measuring factors such as attitudes, norms, perceived behavioral control, and perceived cost of water may help Extension professionals further refine and strengthen behavior change in water conservation programs.

**Purpose and Objectives**

The Theory of Planned Behavior (TPB) guided this research which sought to determine factors affecting urban residents’ intent to engage in water conservation in the United States. The specific objectives of this study were to:
- Evaluate the influence of TPB factors on intention to engage in water conservation.
- Evaluate the influence of perceived cost and personal norms on intention to engage in water conservation.

**Theoretical Framework**

The TPB expands the Theory of Reasoned Action which accounts for cognitive processes of a person’s control over performing a behavior (Ajzen, 2012). The TPB comprises three main variables: attitudes, social norms, and perceived behavioral control (PBC) that affect intention to engage in some behavior. Behavioral beliefs are a person’s attitude towards the behavior; that is whether performance of the behavior is positively or negatively valued by the individual. Normative beliefs, or social norms, are the social pressures to engage or not engage in the behavior. This considers, what do others expect of me? Control beliefs comprise an individual’s perception of their ability to perform the behavior - their perceived behavioral control. PBC is a proxy for actual behavioral control which is the degree of resources and skills a person requires to perform the behavior (Ajzen, 2012). If all prerequisites needed to perform the behavior are present, PBC can directly impact behavior. Overall, the theory states “the more favorable a person’s attitude and social norms, and the more they believe they are capable of performing the behavior, the stronger should be their behavioral intentions” (Ajzen, 2012, p. 447).

Previously, the TPB was applied in behavior change and adoption of water conservation practices. However, it did not include potential factors influencing water conservation practices such as personal norms or perceived cost of water. In some studies, these factors were found to be important considerations impacting water conservation practices. Attari (2014) investigated perceptions of water-use and found improving the public’s understanding of their personal water-use can impact strategies geared towards the adoption of water-saving practices. Fan, Wang, Liu, Yang, & Qin (2014) found significant associations between resident perceptions of personal water-use and actual water-use. Particularly, residents underestimated their outdoor water-use and overestimated the amount of water consumed indoors. Ultimately, those accurately estimating their water-use had better awareness of water conservation practices compared to those who did not. As such, Extension initiatives that target awareness of water-use (through norms) could support the acceptance and implementation of water conservation practices.

The perceived cost of water was explored from various perspectives with mixed results on conservation behaviors, partly because of the complexity of this approach (Sauri, 2013). Block rates and levies on consumer water-use were two of several strategies used in Singapore to reduce water-use (World Bank, 2006), although this strategy may be ineffective among higher-income consumers (Corral-Verdugo, Frias-Armenta, Tapia-Fonllem, & Frijo-Sing, 2012). However, there is promise in exploring the perceived cost of water as part of a behavior change strategy because “the efficacy of pricing for water conservation appears to be higher for outdoor uses than for indoor uses” (Sauri, 2013, p. 233). Jordan (2011) highlighted pricing information necessary for decision-making was not provided on water bills as compared to other goods. Additionally, actual water-use information was not clearly articulated to consumers on their bill. In a survey conducted with 400 people from Georgia, about 62% were aware of their water bill while 26% were unaware as water costs were included in their rent bills. Since water costs can be clearer to consumers and can play a role in motivating outdoor water conservation, perceived cost of water is an important factor when considering changing water consumption behaviors.

Norms are powerful tools Extension professionals can use to stimulate changes in behavior (Kumar Chaudhary, Warner, Lamm, Rumble, & Cantrell, 2015). Personal norms or “self-expectations for behavior backed by the anticipation of self-enhancement or depreciation”
(Schwartz & Fleishman, 1978, p. 307) shape an individual’s decision to act. Such obligations to oneself to perform an act are useful when considering behavior change strategies. In the study by Kumar Chaudhary et al. (2015), over 80% of participants agreed they had a personal responsibility to conserve water in the landscape. In other recent studies, social and personal norms showed promising signs of encouraging pro-environmental behavior change (de Groot, Abrahamse, & Jones, 2013).

Methods and Procedures

The theoretical target audience for this study were urban residents in the United States who engaged in landscaping and irrigation practices. It should be noted this audience is different from the general population and is an important target audience having the most potential to conserve water in the landscape (Warner, Lamm, Rumble, Martin, & Cantrell, 2016). A sampling frame was developed using an online survey company employing a non-probability purposive sampling technique. Purposive sampling entails selection of criteria to obtain a specific population. Given that the study used a non-probability sampling procedure, results cannot be generalized, therefore non-response error was not an issue. Screening questions in the survey confirmed those in the sampling frame had a lawn/landscape, an irrigation system, and had control of their home irrigation system. The final sample size (N) obtained was 1,809. A researcher-developed questionnaire was administered via an online survey. Overall, most respondents (70.0%) were female, and on average 41 years of age where 34.3% had a 4-year college degree, and 21.9% earned between $50,000 to $74,000 per year.

An expert panel qualified in urban water resources engineering, extension education, and water conservation reviewed the questionnaire to ensure validity. A pilot study tested for reliability to ensure there were no significant issues with question construction and ordering. Construct variables in this study were, attitudes, social norms, PBC, personal norms, perceived cost of water, and intent to engage in water conservation. The reliabilities for all variables were between 0.69 and 0.88 indicating acceptable internal consistency (Field, 2006). See Table 1.

Constructs

Indexes were developed by averaging all items under each construct shown in Table 1. Five statements measured on a 5-point scale comprised the attitudes construct using the question stem, please indicate your attitude toward the phrase, “Implementing good irrigation practices is...”. The social norms construct included four statements and used a 5-point Likert scale from strongly disagree to strongly agree. The question stem was, please indicate your level of agreement or disagreement with the following statements. PBC was measured on a 5-point scale and consisted of five statements using the question stem, “please indicate how you feel about the phrase “Implementing good irrigation practices is...””. The perceived cost of water construct included three statements ranging from strongly disagree to strongly agree on a 5-point Likert scale. The question stem was, for this question, please think about the cost of water. Four statements comprised the personal norms construct which ranged on a 5-point scale from strongly disagree to strongly agree. The question stem for this question was, please indicate your level of agreement or disagreement with the following statements”. Twelve statements, measured on a 5-point Likert scale from very unlikely to very likely, were included for the intent to engage in water conservation construct. The question stem, please indicate how unlikely or likely you are to engage in the following water conservation behaviors in the future.
Table 1

*Reliabilities for all Variables*

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<tr>
<th>Indexes and individual items</th>
<th>Cronbach’s alpha (α)</th>
</tr>
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<tr>
<td><strong>Attitudes</strong></td>
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<td>Good: Bad*</td>
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<tr>
<td>Important: Unimportant*</td>
<td></td>
</tr>
<tr>
<td>Foolish: Wise</td>
<td></td>
</tr>
<tr>
<td>Beneficial: Harmful*</td>
<td></td>
</tr>
<tr>
<td>Positive: Negative*</td>
<td></td>
</tr>
<tr>
<td>Unnecessary: Necessary</td>
<td></td>
</tr>
<tr>
<td><strong>Social norms</strong></td>
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<td>The people who are important to me expect that I will manage my landscaping using the smallest amount of water possible</td>
<td></td>
</tr>
<tr>
<td>The people who are important to me expect me to avoid watering the landscape when it is raining</td>
<td></td>
</tr>
<tr>
<td>The people who are important to me would approve if I conserve water in my home landscape</td>
<td></td>
</tr>
<tr>
<td>The people who are important to me would expect that I use good landscape watering practices</td>
<td></td>
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<td><strong>Perceived Behavioral Control</strong></td>
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<td>Possible for me: Not possible for me*</td>
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</tr>
<tr>
<td>Easy for me: Not easy for me*</td>
<td></td>
</tr>
<tr>
<td>In my control: Not in my control*</td>
<td></td>
</tr>
<tr>
<td>Up to me: Not up to me*</td>
<td></td>
</tr>
<tr>
<td>Practical for me: Not practical for me*</td>
<td></td>
</tr>
<tr>
<td><strong>Perceived cost of water</strong></td>
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<tr>
<td>If my water bill was more expensive, I would use less water on my lawn /landscape</td>
<td></td>
</tr>
<tr>
<td>The cost of my water bill affects how much I water my lawn /landscape</td>
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</tr>
<tr>
<td>If my water bill was less expensive, I would use more water on my lawn /landscape</td>
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Table 1 (continued)

Reliabilities for all Variables

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<tr>
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<td><strong>Personal norms</strong></td>
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<tr>
<td>It is important to manage my landscape using the smallest amount of water possible</td>
<td></td>
</tr>
<tr>
<td>I feel a personal obligation to water my landscape using only what is needed</td>
<td></td>
</tr>
<tr>
<td>It is important to encourage my friends and family to manage their landscape using the smallest amount of water possible</td>
<td></td>
</tr>
<tr>
<td>I feel a personal obligation to explore ways to reduce my landscape’s impact on water quantity</td>
<td></td>
</tr>
<tr>
<td><strong>Intent</strong></td>
<td>0.88</td>
</tr>
<tr>
<td>Eliminate irrigated areas in my landscape</td>
<td></td>
</tr>
<tr>
<td>Turn off zone(s) or cap irrigation heads for established woody plants</td>
<td></td>
</tr>
<tr>
<td>Convert turf-grass areas to landscaped beds</td>
<td></td>
</tr>
<tr>
<td>Replace high water plants with drought tolerant plants</td>
<td></td>
</tr>
<tr>
<td>Replace high volume irrigated areas with low volume irrigation</td>
<td></td>
</tr>
<tr>
<td>Install smart irrigation controls (such as soil moisture sensors (SMS) or an evapotranspiration device (ET)) so irrigation will not turn on when it is not needed</td>
<td></td>
</tr>
<tr>
<td>Calibrate my sprinklers</td>
<td></td>
</tr>
<tr>
<td>Use a rain gauge to monitor rainfall for reducing/skipping irrigation</td>
<td></td>
</tr>
<tr>
<td>Use a rain barrel or cistern</td>
<td></td>
</tr>
<tr>
<td>Use different irrigation zones/zone run times based on plants’ irrigation needs</td>
<td></td>
</tr>
<tr>
<td>Seasonally adjust irrigation times</td>
<td></td>
</tr>
<tr>
<td>Follow watering restrictions</td>
<td></td>
</tr>
</tbody>
</table>

*Items reversed in survey to reduce response-set bias.

**Interpretation of Constructs**

For the dependent variable intent, a higher score indicated a greater likelihood to engage in irrigation best practices. For the independent variable attitude, a higher score indicated more positive attitudes toward good irrigation practices. Higher social norms scores indicated a greater level of agreement concerning the expectations others had of an individual to conserve water in their landscape. Higher perceived behavioral control scores indicated greater perceived ability to engage in good irrigation practices. A higher perceived cost of water score indicated a greater perception that the cost of water influenced personal water-use. Higher personal norms scores indicated greater personal obligation to conserve water in the landscape.
Analysis

Two models were tested using hierarchical multiple regression analysis. For model one, independent variables (predictors of intention) were aligned with the TPB variables - attitudes toward implementing good irrigation practices, perceived social norms about water conservation, and perceived control over implementing good irrigation practices. The dependent variable was intent to engage in water conservation. Model one:

\[ I = f(A, SN, PBC) \]

Where \( I \) = intent to engage in water conservation; \( A \) = attitudes toward implementing good irrigation practices; \( SN \) = perceived social norms; and \( PBC \) = perceived control over engaging in good irrigation practices.

Model two included two additional independent variables - perceived cost of water and personal norms regarding water quantity (using good irrigation practices to conserve water) were added to the TPB variables in model one. Model two:

\[ I = f(A, SN, PBC, PC, PN) \]

Where \( PC \) = perceived cost of water; \( PN \) = personal norms concerning good irrigation practices.

Results

Evaluate the Influence of TPB Factors on Intention to Engage in Water Conservation

Table 2 presents the results for the TPB variables (model one). Overall, the model was statistically significant \((F = 166.14; p < 0.001)\), and independent variables explained 21.6% of the variance in intent to engage in water conservation. Both social norms and PBC were statistically significant variables in the model. There was a statistically significant and positive association between social norms and intent to engage in water conservation \((t = 18.13, p < 0.001)\). A one standard deviation unit (SD-unit) increase in perceived social norms was associated with a 0.412 SD-unit predicted increase in intent to engage in water conservation. That is, an increase in social norms (the expectations others had of an individual to conserve water) was positively correlated with an increase in intent to engage in water conservation.

There was also a statistically significant and positive association between PBC and intent to engage in water conservation \((t = 5.48, p < 0.001)\). A one SD-unit increase in PBC to implement good irrigation practices was associated with a 0.140 SD-unit predicted increase in intent to engage in water conservation. Therefore, an increase in a person’s perceived ability to engage in good irrigation practices was positively correlated with intent to engage in water conservation. The standardized beta values indicated social norms had a stronger effect (0.412) on intent to engage in water conservation than PBC (0.140).
Table 2

**OLS Results for Model 1 – TPB Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\beta$</th>
<th>Std. Error</th>
<th>$t$</th>
<th>Std. $\beta$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.521</td>
<td>0.157</td>
<td>9.718</td>
<td>-</td>
<td>0.000</td>
</tr>
<tr>
<td>Attitudes</td>
<td>-0.070</td>
<td>0.036</td>
<td>-1.933</td>
<td>-0.048</td>
<td>0.053</td>
</tr>
<tr>
<td>Social norms</td>
<td>0.478</td>
<td>0.026</td>
<td>18.133</td>
<td>0.412</td>
<td>0.000***</td>
</tr>
<tr>
<td>PBC</td>
<td>0.157</td>
<td>0.029</td>
<td>5.478</td>
<td>0.140</td>
<td>0.000***</td>
</tr>
</tbody>
</table>

*Note. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. $R^2 = 0.216\ (F = 166.14, p < 0.001)$*

Evaluate the Influence of Perceived Cost and Personal Norms on Intention to Engage in Water Conservation

Table 3 presents results for the inclusion of two additional independent variables; perceived cost of water and personal norms partialling out the effects of the TPB variables. The omnibus $F$ test indicated the model was statistically significant ($F = 133.28; \ p < 0.001$), and independent variables explained 27% of the variation in intent to engage in water conservation. Notably, the change in the $R^2$ value was statistically significant. All variables in the model had statistically significant correlations with intent to engage in water conservation.

There was a statistically significant and negative association between attitudes and intent to engage in water conservation ($t = -2.30, \ p < 0.05$). A one SD-unit increase in attitudes (toward positive) was associated with a 0.056 SD-unit predicted decrease in intent to engage in water conservation. That is, an increase in positive attitudes was negatively correlated with intent to engage in water conservation. There was also a statistically significant and positive relationship between social norms and intent to engage in water conservation ($t = 6.65, \ p < 0.001$). A one SD-unit increase in perceived social norms was correlated with a 0.200 SD-unit predicted increase in intent to engage in water conservation. That is, an increase in social norms (the expectations others had of an individual to conserve water) was positively correlated with an increase in intent to engage in water conservation. There was a statistically significant and positive association between PBC and intent to engage in water conservation ($t = 4.92, \ p < 0.001$). A one SD-unit increase in PBC was associated with a 0.122 SD-unit predicted increase in intent to engage in water conservation. Therefore, an increase in a person’s perceived ability to engage in good irrigation practices was positively correlated with intent to engage in water conservation.

Both perceived cost (PC) and personal norms (PN) had statistically significant associations with intent to engage in water conservation. There was a statistically significant and positive association between PC and intent to engage in water conservation ($t = 5.70, \ p < 0.001$). A one SD-unit increase in perceived cost of water was positively associated with a 0.116 SD-unit predicted increase in intent to engage in water conservation. That is, an increase in the perceived cost of water was positively correlated with intent to engage in water conservation. There was also a statistically significant and positive relationship between PN and intent to engage in water conservation ($t = 9.49, \ p < 0.001$). A one SD-unit increase in personal norms concerning using good irrigation practices was positively associated with a 0.284 SD-unit predicted increase in intent to engage in water conservation. An increase in personal obligations to conserve water in the landscape increased was positively correlated with intent to engage in water conservation. Overall, personal norms had the strongest effect (0.284) on intent to engage in water conservation. Given the
statistically significant change in $R^2$ from 21.6% to 27%, perceived cost of water and personal norms increased the predicting power of model two. Therefore, model two was a better fit for predicting intent to engage in water conservation practices.

Table 3

**OLS Results for Model 2 – Inclusion of Cost and Personal Norms Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>Std. Error</th>
<th>t</th>
<th>Std. β</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.018</td>
<td>0.161</td>
<td>6.330</td>
<td>-</td>
<td>0.000</td>
</tr>
<tr>
<td>Attitudes</td>
<td>-0.082</td>
<td>0.035</td>
<td>-2.304</td>
<td>-0.056</td>
<td>0.021*</td>
</tr>
<tr>
<td>Social norms</td>
<td>0.232</td>
<td>0.035</td>
<td>6.652</td>
<td>0.200</td>
<td>0.000***</td>
</tr>
<tr>
<td>PBC</td>
<td>0.137</td>
<td>0.028</td>
<td>4.923</td>
<td>0.122</td>
<td>0.000***</td>
</tr>
<tr>
<td>PC</td>
<td>0.090</td>
<td>0.016</td>
<td>5.696</td>
<td>0.116</td>
<td>0.000***</td>
</tr>
<tr>
<td>PN</td>
<td>0.326</td>
<td>0.034</td>
<td>9.489</td>
<td>0.284</td>
<td>0.000***</td>
</tr>
</tbody>
</table>

*Note.* *p < 0.05, **p < 0.01, ***p < 0.001. $R^2 = 0.270$ (F = 133.28, p < 0.001)

**Conclusions and Recommendations**

This study applied the Theory of Planned Behavior (TPB) to determine significant factors affecting urban residents’ intent to engage in water conservation. When considering only those variables in the TPB, social norms and perceived behavioral control (PBC) were statistically significant predictors of intent to conserve water. Social norms had a stronger impact on intent to engage in water conservation than PBC. This result is similar to results reported by de Groot et al., (2013) highlighting the significance of social norms in encouraging pro-environmental behaviors. Social norms are essential tools for stimulating decision-making processes to act on some desired behavior. With the inclusion of two additional independent variables, perceived cost (PC) and personal norms (PN), all variables were statistically significant predictors of intent to conserve water. Attitudes, social norms, PBC, PC, and PN were influential on intent to conserve water. Attitudes were not statistically significant in model one, however negatively correlated with intent to engage in water conservation in model two. While statistical significance was present for attitudes in model two, its associated standardized beta value was negligible. The result of this statistical significance can be due to the large sample size. Other factors such as motivation to act can be influenced by norms and should also be an important consideration (Schultz, 1999). Social norms and PBC were statistically significant predictors of intent to conserve (model one) consistent with previous studies. With all variables considered (model two), personal norms had the strongest effect on intent to engage in water conservation. This finding highlights the importance of personal norms on intentions to act, similar to findings by de Groot et al. (2013) and Schwartz and Fleishman (1978). Perceived cost of water was also a statistically significant predictor of intent to engage in water conservation, suggesting the importance of residents’ perceptions of water-use (Attari, 2014) and awareness of how much their water costs.

Both social and personal norms had the greatest effect on intent to engage in water conservation. This result highlights the significance of norms as factors of intent, and eventual behavior adoption, consistent with literature by Schultz (1999). As a result, we recommend making known (and implementing together) social and personal norms in extension water conservation programs. The use of norms in water conservation programs can help increase resident awareness
of water-use and ultimately inspire engagement in water saving practices. Community members should be involved in planning and implementation of water conservation campaigns. For example, regular workshops supported by Extension but led by community members can help build a water conservation ethic within the community. Residents might feel a personal obligation and motivation to conserve water if their friends and neighbors and others in the community engage in these practices. Perhaps water conservation can be made truly social through community conservation parties where small groups can go house to house with an extension professional and strategize collectively on customized ways to save water.

Messages to residents communicating positive reinforcement can help to build internal obligations to conserve water. For example, a utility company might share a household’s water savings compared with a previous year or billing cycle with the household in their monthly utility bill. The message should frame their saving water as a way to serve as role models, and as a way to ensure they personally have water available for their needs (i.e., household water use, recreation). Additionally, collaborations among Extension, homeowners’ associations (HOAs), and local utility companies can also help promote water saving practices. Through collaborations with HOAs, information on water saving practices by others in the community can be made apparent to residents. Involving individuals on a community level can encourage others to engage in water conservation practices. It is also important that these behaviors continue into the future. Therefore, the use of social marketing tools such as prompts, and commitments can act as reminders and pledges to help support future engagement in reducing water-use.

Partnering with a local utility company provides information on water costs to residents. Awareness of water conservation behaviors adopted by others in the community (e.g. friends and neighbors), as well as the community’s total water-use and cost can encourage further engagement by others. Knowledge of personal water-use and cost can also stimulate water saving behaviors as residents may seek to lower their costs if perceived as high. With information on conservation behaviors practiced by others in the community, the community’s total water-use and cost, and personal water-use and cost can collectively stimulate personal obligations and motivation to conserve water. Extension professionals should follow-up with residents in the future to evaluate if this strategy was useful in encouraging water conservation practices. The results of this study align with research priority seven of the National Research Agenda of the American Association for Agricultural Education. Research priority seven addresses complex problems such as water conservation and seek to determine effective methods and programs that help people solve complex problems (Roberts, Harder, & Brashears, 2016).

As this study applied non-probability sampling and results cannot be generalized, we recommend replication of this research using random sampling. Future studies can explore a person’s awareness of their water bill and the perceived amount allocated to outdoor irrigation. An experimental design can determine if knowledge of water cost would influence changes in the amount of water used for outdoor irrigation. Based on the literature by Jordan (2011) and Saurí (2013), the difference between awareness of water consumption, and consuming less water based on income and cost is one possible area that can be studied. Since a clear understanding of the actual cost of water used for the lawn and landscape might be lacking, it is unknown whether clarifying the actual cost could play a role in eliciting water conservation behaviors. There is an opportunity for agricultural communication professionals to work on helping residents to fully understand the cost of water. There are likely instances where one strategy may be effective over another, and residents’ personal characteristics may influence the selected approach. Since personal norms had the greatest effect on intent, a field experiment can test this result in the context of extension programming. Further research is needed to better understand the source of stronger personal norms among some residents; the findings could be used to inform strategies that enhance
existing personal norms. Comparing the results of future research to this study will help determine the accuracy of these recommendations.

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Instrument Validity in Manuscripts Published in the Journal of Agricultural Education between 2007 and 2016

Hailey R. Gates¹, Donald M. Johnson,² & Catherine W. Shoulders³

Abstract

We examined authors’ treatment of instrument validity in a stratified random sample (n = 94) of quantitative studies published in the Journal of Agricultural Education from 2007 to 2016. A majority (78.7%) of studies reported use of either a researcher-developed instrument (41.5%) or an existing instrument modified by the researchers (37.2%). In 67.0% of articles, authors validated the instrument for the study reported; in 16.0%, the authors claimed instrument validity based on previous studies. Authors made no claim for instrument validity in 11.7% of articles and claimed an unspecified form of validity in another 11.7%. Among the 72 articles where specific validity claims were made, 67 (93.1%) claimed face and content validity, either alone or in combination with other forms of validity. Claims for content, concurrent, and discriminant validity, either alone or in combination with other forms of validity, were made in 11 (15.3%) of the 72 articles. Among 70 articles claiming face, content, or construct validity, 91.4% included a description of the validation panel; panelists were most often described as ‘experts’ (70.3%), although their area(s) of expertise were specified in only 29.7% of articles. We conclude with specific recommendations intended to shift the profession’s subjective norms related to instrument validity.

Keywords: instrument, validity, manuscript, Journal of Agricultural Education

Introduction

The rigorous process of inquiry into social and behavioral questions via use of “systematic observation and measurement methods, standardized tests, sophisticated coding schemes for analyzing verbal and observational data, carefully constructed questionnaires, individual and group interview techniques, and large masses of data” (Krathwohl, 2009, p. 4) began only in the 20th century. While a relatively new field of research, progress within social science continues to accelerate. Growth within a knowledge base occurs through the creation of improved research methods and development of well-trained researchers (Krathwohl, 2009). Disciplinary faculty members are expected to contribute to that knowledge base through research and are evaluated on their ability to effectively do so (Knobloch, 2010).

When conducting research, faculty members contribute to the knowledge base through published works in peer-reviewed journals; within the agricultural education profession, the

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premier peer-reviewed journal is the *Journal of Agricultural Education (JAE)* (Knobloch, 2010). The review process for manuscripts submitted to *JAE* includes an evaluation of research methods, requiring that reviewers critique with the following three questions in mind:

1. Are the essentials of methods/procedures reported?
2. Are the methods/procedures correct?
3. Are weaknesses in the methods/procedures accounted for and/or explained? (American Association for Agricultural Education, n.d.)

Reviewers are able to reject manuscripts based on this criteria, suggesting that researchers who are unable to carry out methodologically sound studies are less likely to publish or contribute to the knowledge base.

Many components contribute to the “correctness” of a study’s methods. Among those is the quality of the instrument used to collect data; “the conclusions drawn and the recommendations made in such studies can be no better than the data on which they are based” (Huck, 2008, p. 75). In turn, the data collected can be no better than the instrument used to collect the data. According to Borg and Gall (1985), “the findings of research . . . can only be evaluated after the measurement tools that produced these findings have been carefully appraised” (p. 209). The two primary measures of instrument quality are reliability and validity (Huck, 2008).

Shoulders, Johnson, and Flowers (2015), VanLeeuwen (1997), VanLeeuwen, Dormody, and Seevers (1999), and to a greater degree, Warmbrod (2014) addressed the concept of instrument reliability within agricultural education manuscripts. Equally or even more important (Ary, Jacobs, & Sorenson, 2010), and yet to be the focus of quantitative evaluation by the agricultural education profession, is validity. Validity has traditionally been defined as the extent to which an instrument measures what it purports to measure; however, the current definition of validity (Ary et al., 2010) no longer focuses on the instrument itself but, rather, “on the validity of the interpretations or inferences that are drawn from the instrument’s scores” (p. 225). Thus, an instrument is valid only to the extent it allows accurate interpretations or inferences about the specific individuals completing the instrument.

According to Warmbrod (2014), researchers should provide evidence “in journal articles documenting the validity of test scores, including a description of item-generating strategies to establish content validity, judgements of experts attesting face validity, and empirical evidence documenting criterion and construct validity” (p. 30). As has been recommended by Johnson and Shoulders (2017), Lindner, Murphy and Briers (2001), Miller and Smith (1983), Roberts, Barrick, Dooley, Kelsey, Raven, and Wingenbach (2011), and Warmbrod (2014), this study sought to examine the profession’s treatment of instrument validity as a means of improving the quality of research published within *JAE*.

**Theoretical Framework**

This study described the use of instrument validity within manuscripts published in JAE between 2007 and 2016 using the theory of planned behavior as the guiding framework (Ajzen, 1991). The theory of planned behavior posits that an individual’s attitude toward a behavior, his or her perceived control over the behavior, and the subjective norms regarding the behavior interact to influence the individual’s intention to perform the behavior, which in turn influences the individual’s actual behavior (see Figure 1) (Ajzen, 1991).
Within this study, we assumed researchers publishing in *JAE* hold positive attitudes regarding instrument validity and the employment of methods used to establish instrument validity, as they continue to publish in a journal that includes validity as a criterion. Multiple publications within *JAE* have called for an examination of the use of validity within the journal’s works, establishing a subjective norm that expects the employment of methods to establish validity of instruments within agricultural education research. By including within this manuscript a primer on establishing instrument validity (found within the Conceptual Framework), we aim to improve readers’ perceived behavioral control by “reducing unfamiliar elements within the behavioral situation” (Johnson & Shoulders, 2017, p. 303). The theory of planned behavior states that successful efforts to improve individuals’ perceived behavioral control can encourage individuals to engage in an intended behavior. Therefore, by bringing to light authors’ practices as stated within *JAE* manuscripts and by providing a primer on methods to establish instrument validity, this manuscript enables researchers to examine, and potentially improve upon, their current behaviors regarding the establishment of instrument validity (see Figure 2).
As is noted in the Theoretical Framework, altering one’s perceived behavioral control by reducing the barriers that prevent him or her from carrying out an action can shift his or her intention to carry out a behavior (Ajzen, 1991). Lack of knowledge required to carry out a behavior is one such barrier that can be reduced (Johnson & Shoulders, 2017). Therefore, we offer a primer in instrument validity and methods to establish this criteria.

Defining Instrument Validity

Research in the social sciences often seeks to quantify attributes that cannot be measured directly (Kimberlin & Winterstein, 2008). Example attributes studied by agricultural education researchers include leadership, agricultural literacy, job satisfaction, burnout, creative thinking, and professionalism, among others (Radhakrishna & Wu, 1997). In studying an attribute, researchers must first develop a conceptual definition of the attribute and then translate this conceptual definition into an operational definition with associated instrument items and measurement scales (Kimberlin & Winterstein, 2008). According to Kimberlin and Winterstein (2008), “the ability to operationally define and quantify a construct is the core of measurement” (p. 278). Thus, fidelity between measurement items, the operational definition, and the original conceptual definition is an essential element of quality research (Trochim, 2006).

Instrument, or measurement, validity refers to the degree of accuracy achieved by the instruments used within a study (Huck, 2008), and the appropriateness of the inferences or decisions made from the results generated by the instrument (Ary et al., 2010; McMillan & Schumacher, 2010). While reliable data are consistent, it is possible for data to be simultaneously reliable and invalid – reliable data can consistently report something other than what the researcher intends to measure. The reverse, however, is not true; while reliable data is not necessarily valid, valid data must be reliable, as data cannot be accurate if not consistent. “Thus high reliability is a
necessary but not sufficient condition for high validity” (Huck, 2008, p. 89). Instrument validity is a product of the specific situation and subjects in which the instrument is given; therefore, “in order to assure others that the procedures have validity in relation to the research problems, subjects, and setting of the study, it is incumbent on the investigator to describe validity in relation to the context in which data are collected” (McMillan & Schumacher, 2010, p. 173). Thus, instruments validated in different situations and with different subjects should not be assumed to be valid in different situations and with different subjects. According to Ary et al. (2010), “validity does not travel with the instrument. A test may be valid for use with one population or setting but not with another” (p. 225).

Establishing Instrument Validity

Researchers can establish one or more of several types of instrument validity, as “there are different ways in which scores can be accurate” (Huck, 2008, p. 89). While works detailing research methods organize the same types of validity in various ways, we adhered to Huck’s (2008) conceptual framework of validity, which aligns methods of establishing validity with three overall types: content validity, criterion-related validity, and construct validity. Content validity refers to the degree to which the content intended to be measured is covered by the instrument’s items (Huck, 2008; McMillan & Schumacher, 2010). Content validity is established via a panel of experts who examine the instrument to determine whether alignment exists between the instrument’s items and the content on which the instrument is intended to assess subjects (Huck, 2008; McMillan & Schumacher, 2010). Experts should be selected based on their technical expertise, as they should be capable of making sound judgements regarding the content. “When reporting on efforts made to assess content validity, researchers should describe in detail who examined the content, what they were asked to do, and how their evaluative comments turned out” (Huck, 2008, p. 95). While content validity requires a detailed description of the content to serve as a checklist when evaluating an instrument, face validity is a less systematic method of establishing whether an instrument’s items align with the intended content (McMillan & Schumacher, 2010). Face validity relies on the subjective opinions of experts to determine whether the instrument, “on its face” (Trochim, 2006, para. 6) appears to measure the intended content. Because of the subjectivity required to establish face validity, it is considered by some researchers to be the weakest way to demonstrate validity (Lund Research, 2012; Trochim, 2006).

Criterion-related validity is established by comparing scores on an instrument with scores on an instrument known to accurately measure a relevant criterion variable (Huck, 2008). Relevancy of variables with which the comparison is made is crucial; “if the other variables are illogical or if the validity of the scores associated with such variables is low, then the computed validity coefficients conceivably could make a truly good instrument look as if it is defective” (Huck, 2008, p. 95). Correlating subjects’ scores between the two instruments results in a validity coefficient; higher r values indicate higher validity. Criterion-related validity can be established via concurrent instrument administrations, wherein subjects are given both instruments within a short time frame, or via a predictive format, wherein the criterion is measured years before or after the instrument is administered (Huck, 2008; McMillan & Schumacher, 2010).

Construct validity establishes the degree to which an instrument is able to measure “how much of a personality or psychological construct is possessed by the examinees to whom the instrument is administered” (Huck, 2008, p. 92). Researchers establish construct validity by employing one or more of the following three actions:

1. provide correlational evidence showing that the construct has a strong relationship with certain measured variables and a weak relationship with other variables, with the strong
and weak relationships conceptually tied to the new instrument’s construct in a logical manner;

2. show that certain groups obtain higher mean scores on the new instrument than other groups, with the high- or low-scoring groups being determined on logical grounds prior to the administration of the new instrument; or

3. conduct a factor analysis on scores from the new instrument (Huck, 2008, p. 92).

When providing correlational evidence, strong relationships establish convergent validity, while weak relationships establish divergent, or discriminant, validity.

The multitrait-multimethod matrix (MTMM) method can also be used to establish construct validity in studies examining two or more constructs. MTMM uses correlations between multiple measures of each construct to examine construct validity through simultaneous consideration of the resulting matrix of convergent and divergent validity coefficients (Trochim, 2006).

**Purpose and Objectives**

The purpose of this study was to describe authors’ practices in addressing instrument validity for selected articles published in the *Journal of Agricultural Education* from 2007 to 2016. Specific objectives were to:

1. Describe the primary purpose of research reported in selected articles published in *JAE* from 2007 to 2016;

2. Describe the nature of the dependent variables studied in selected articles published in *JAE* from 2007 to 2016;

3. Describe the source of research instruments used in selected articles published in *JAE* from 2007 to 2016;

4. Describe the nature of instrument validity claims made in selected articles published in *JAE* from 2007 to 2016; and

5. Describe the specific types of validity claimed in selected articles published in *JAE* from 2007 to 2016.

**Methodology**

This study utilized a content analysis strategy to make inferences from communication observed using replicable and reliable methods (Krippendorff, 1980). The articles identified for this study were observed from 559 manuscripts published by *JAE* between 2007 and 2016. One hundred thirty-five articles were randomly selected through stratified random sampling by volume and issue to ensure equal representation throughout the years. Ninety-four of the selected articles were deemed to be quantitative in nature; 41 articles were removed from the originally selected 135 because they conducted qualitative inquiry, for which instrument validity does not apply.

Researchers developed and employed a standardized coding sheet to document the following information from each article: (a) purpose of research, (b) whether the instrument used
existed previously or was researcher-developed, (c) whether instrument validity was addressed by researchers, (d) whether the instrument was validated for the study, (e) type(s) of validity addressed, (f) number of people on panel if face or content validity was used, (g) description of people on panel if face or content validity was used, (h) correlations presented if criterion-related validity was used, and (i) in-text citations used to support validity methods. The content coded for this study was considered to be manifest content. According to Potter and Levine-Donnerstein (1999), manifest content “is that [content] which is on the surface” (p. 259) and is easily observable. In coding manifest content, validity is achieved by defining content with “binary rules based on definitions” (p. 261). The coding sheet used in this study contained specific binary definitions and rules, based on the validity literature (Ary et al., 2010; Huck, 2008) that guided coding decisions.

Identification numbers were assigned to each article and the article’s title page, purpose and objectives, and methods sections were printed and keyed to the identification number on the coding sheet to allow for data verification. All coding was completed by one researcher. A second researcher coded a randomly selected sample of 10 manuscripts (10.1%), with an overall agreement percentage of 88.6%. The resulting Cohen’s kappa of .77 indicated “substantial” (≥ .61) and approaching “almost perfect” (kappa ≥ .81) agreement between raters (Viera & Garrett, 2005). Data were analyzed using frequencies and percentages.

**Results**

Of the 559 articles published in *JAE* from 2007 to 2016, 135 (24.2%) articles were randomly selected to be included in the sample; of these selected articles, 94 (69.6%) articles met the criteria for inclusion and were analyzed as part of this study. The primary objective of the vast majority (90.1%) of all articles was to describe characteristics or phenomena. Relatively few articles sought to predict or to establish cause and effect relationships (see Table 1).

**Table 1**

*Primary Objective(s) of Selected Articles Published in the Journal of Agricultural Education, 2007-2016*

<table>
<thead>
<tr>
<th>Purpose(s) of study</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe</td>
<td>89</td>
<td>90.1</td>
</tr>
<tr>
<td>Predict</td>
<td>8</td>
<td>8.2</td>
</tr>
<tr>
<td>Establish cause and effect</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Total</td>
<td>98</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Note.* Four of the 94 (4.2%) articles had primary objectives in two categories.

Approximately 86% of articles studied dependent variables measuring achievement, attitudes or perceptions, and/or behavior(s) (see Table 2). The remaining studies reported dependent variables categorized as ‘other’ and included measurements of adequacy, relationships, and skills. Over one-half of all articles studied variables in two or more categories.
Table 2

Nature of Dependent Variables in Selected Articles Published in the Journal of Agricultural Education, 2007-2016

<table>
<thead>
<tr>
<th>Nature of dependent variable(s)</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement</td>
<td>42</td>
<td>31.3</td>
</tr>
<tr>
<td>Attitudes or perceptions</td>
<td>38</td>
<td>28.4</td>
</tr>
<tr>
<td>Behavior(s)</td>
<td>35</td>
<td>26.1</td>
</tr>
<tr>
<td>Other</td>
<td>19</td>
<td>14.2</td>
</tr>
<tr>
<td>Total</td>
<td>134</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note. Fifty-five of the 94 (58.5%) articles had dependent variables in two or more categories.

The largest single percentage (41.5%) of articles reported use of researcher-developed instruments; however, the combined categories of existing instruments and existing instruments modified by the researchers constituted over one-half (56.4%) of all reported instruments. Two studies (2.1%) reported use of both modified and researcher-developed instruments (see Table 3).

Table 3

Source of Research Instruments Used in Selected Articles Published in the Journal of Agricultural Education, 2007-2016

<table>
<thead>
<tr>
<th>Instrument source</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing - no modifications</td>
<td>18</td>
<td>19.2</td>
</tr>
<tr>
<td>Existing - modified by researcher(s)</td>
<td>35</td>
<td>37.2</td>
</tr>
<tr>
<td>Researcher-developed</td>
<td>39</td>
<td>41.5</td>
</tr>
<tr>
<td>Existing - modified by researcher(s) and researcher-developed</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Instrument validity was addressed in some manner by authors in 83 of the 94 (88.3%) selected articles published in JAE between 2007 and 2016 (see Table 4). Of those 83 articles, over three-fourths (75.9%) reported the instrument(s) were validated for the current study, while 18.1% reported validation based on previous research and the remaining 6% reported validation based on both current and previous research.
Table 4

Nature of Validity Claims Made in Selected Articles Published in the Journal of Agricultural Education, 2007-2016

<table>
<thead>
<tr>
<th>Nature of validity claim</th>
<th>( f )</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>None made</td>
<td>11</td>
<td>11.7</td>
</tr>
<tr>
<td>Based on validation from previous research</td>
<td>15</td>
<td>16.0</td>
</tr>
<tr>
<td>Based on validation for current research</td>
<td>63</td>
<td>67.0</td>
</tr>
<tr>
<td>Based on both validation from previous research and validation for current research</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>100.0</td>
</tr>
</tbody>
</table>

As previously indicated, 11.7% of articles made no validity claims while an additional 11.7% claimed some unspecified form of validity, generally using wording similar to, “the instrument was examined by a panel of experts and judged to be valid.” A combination of face and content validity was claimed in 42 (58.3%) of the 72 articles where specific validity claims were made. In addition, single claims for either face (11.1%) or content (15.3%) validity were made in slightly over one-fourth of the 72 articles. Claims for face and content validity, either alone or in combination with other forms of validity, were claimed in 67 (93.1%) of the 72 articles. Claims for content, concurrent, and discriminant validity, either alone or in combination with other forms of validity, were made in 11 (15.3%) of the 72 articles.

Table 5

Type(s) of Validity Claimed in Selected Articles Published in the Journal of Agricultural Education, 2007-2016

<table>
<thead>
<tr>
<th>Type(s) of validity claimed</th>
<th>( f )</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>11</td>
<td>11.7</td>
</tr>
<tr>
<td>Not specified</td>
<td>11</td>
<td>11.7</td>
</tr>
<tr>
<td>Face</td>
<td>8</td>
<td>8.5</td>
</tr>
<tr>
<td>Content</td>
<td>11</td>
<td>11.7</td>
</tr>
<tr>
<td>Construct</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Discriminant</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Face and content</td>
<td>42</td>
<td>44.7</td>
</tr>
<tr>
<td>Content and construct</td>
<td>4</td>
<td>4.3</td>
</tr>
<tr>
<td>Face, content and construct</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Construct, concurrent and discriminant</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Among the 70 studies reporting some combination of face, content, or construct validity, 64 (91.4%) described the composition of the instrument validation panel. Panel members were most frequently described as ‘experts’ ($f = 45$, 70.3%), although the specific area of expertise was specified in only 22 cases (29.7%). The most frequently specified area of expertise was agricultural and extension education ($f = 10$, 45.5%). Panelists were described as ‘faculty experts’ or ‘expert faculty’ in 11 of the 64 (17.2%) studies with no additional information provided. The number of individuals serving on the validation panel was reported for 27 (38.6%) of 70 studies and ranged from two to 13, with a mean of 5.22 ($SD = 2.59$) members.

**Conclusions/Implications/Recommendations**

Previous scholars have examined the methods agricultural education researchers use to review the literature (Kildow, Zimmerman, Shoulders, & Johnson, 2014; Swafford & Anderson, 2007), develop theoretical frameworks (Camp, 2001), control for nonresponse error (Johnson & Shoulders, 2017; Linder et al., 2001; Miller & Smith, 1983), analyze and report results based on Likert-type scales (Warmbrod, 2014), describe effect sizes (Kotrlik, Williams, & Jabor, 2011), and select papers for presentation at scholarly conferences (Shoulders et al., 2015). The purpose of these efforts has been to improve the quality and impact of the research conducted and reported by the profession. As indicated by the number of manuscripts published on the topic, the agricultural education profession holds value in examining the quality of its research, and is dedicated to data-driven improvement of that research. To date, instrument validity has remained an unexamined aspect of the profession’s research quality, yet holds great influence on the ability of researchers to report accurate data and make appropriate generalizations (Ary et al., 2010; McMillan & Schumacher, 2010). To close this gap, the current study addresses the profession’s approach to instrument validity in a continued effort to improve research in agricultural education.

Consistent with Fuhrman and Ladewig (2008), a majority (90.1%) of the quantitative studies examined were primarily descriptive in nature. The primary dependent variables studied were achievement (31.3%), attitudes or perceptions (28.4%), and behaviors (26.1%). The use of existing instruments, which is commonly used to ensure accuracy (Huck, 2008), was seen most frequently (56.4%) with and without modifications. Despite the criteria established for acceptance in *JAE*, 22 (23.4%) articles reviewed for this study either made no claim toward the nature of their instruments’ validity, or did not specify what type of validity was employed. These findings suggest researchers did not attempt to establish instrument validity, and imply that *JAE* reviewers either failed to take note of the omission of instrument validity, or deemed the omission to be inconsequential to the accuracy of the manuscripts’ findings and conclusions. Huck (2008) identified a lack of validity as a threat to the overall correctness of the study itself. Further, an additional 16% of the articles claimed instrument validity via the validity established and cited in previously published research. However, according to Ary et al. (2010), “validity does not travel with the instrument” (p. 25). McMillan and Schumacher (2010) stated that instrument validity should be established within the context in which data are collected in order to ensure the instrument yields valid interpretations or inferences about the specific group completing the instrument. The high value placed on quality research within *JAE* is not represented through these practices; therefore, we recommend researchers take efforts to establish and thoroughly report test validity within manuscripts. Additionally, we recommend that reviewers for *JAE* evaluate studies attempting to establish validity via previous studies accordingly, and consider offering feedback to authors that encourages them to establish validity within their own studies and adequately report the process and subsequent results.

The use of face validity, which has been considered by researchers to be the weakest measurement of validity due to its subjective nature (Lund Research, 2012; Trochim, 2006), was
reported by over half (53.2%) of the 72 articles. The use of an instrument validation panel was described in the majority (91.4%) of articles reporting face, content, and construct validity. Huck (2008) recommended the use of an instrument validation panel be accompanied with a description of who the experts are, what they do, and how their comments were evaluated. Panel members were most frequently described as ‘experts’ (70.3%), with information pertaining to what they do or who they are limited to ‘faculty experts’ or ‘expert faculty’ (17.2%). Fewer than half (45.5%) indicated these panel members were employed within the field of agricultural and extension education, while the remaining articles did not offer further information regarding the fields in which these experts worked. We recommend manuscript space be devoted by researchers to provide thorough descriptions of the merits of members of expert panels responsible for establishing face, content, and construct validity.

Fewer than 10% of the articles included efforts to establish concurrent or discriminant validity, considered to be most rigorous among validity methods (Huck, 2008). We posit this low rate of inclusion may be attributed to researchers’ lack of awareness or confidence in performing these tests. Alternately, the low rate of inclusion of these types of validity may be a reflection of authors’ understanding and acceptance of the subjective norms related to validity within the agricultural education profession. Therefore, adhering to the theory of planned behavior, we recommend the findings of this study be disseminated with researchers in order to stimulate conversation related to expectations of establishing instrument validity. Through these discussions, we can shift subjective norms of describing phenomena based on face-validated instruments, thereby stimulating progress within agricultural education through quality research (Krathwohl, 2009).

References


Urban and Rural Latino Students’ Experiences in Agricultural Education: Toward Defining Rural Privilege

Kristopher M. Elliott¹ & Misty D. Lambert²

Agricultural Education programs continue to become more diverse and dynamic. However, diversity does not necessarily ensure equity or inclusion. As such, many programs strive to increase inclusive programming and ensure all students fully actualize the three-circle model of school based agricultural education. In some programs, students from rural and non-rural backgrounds coexist in a single setting. As part of a larger parallel mixed methods multiple case study investigating the experiences of Latino students in Agricultural Education, the data from this sub-study found certain inequalities between the rural and non-rural students in three of the four cases. Three sub-themes emerged from the data: 1) Students from non-rural backgrounds may not possess the same understanding of agriculture and agricultural education as their urban counterparts; 2) Lack of privileged information may present a barrier to access, enrollment, and involvement in secondary agricultural education programs; and, 3) Students from non-rural backgrounds tend to report fewer opportunities and more barriers to fully actualizing the three-circle model. Thick, rich descriptions are provided of the participants’ perceptions of these inequalities. Furthermore, researchers offer a working definition of Rural Privilege along with suggestions for practice and further research.

Keywords: diversity; equity; Latino students; Latinx; privilege; rural; rural privilege; urban; agricultural education

Introduction and Review of Literature

Just as the United States continues to become more diverse (U.S. Census, 2011) so does Agricultural Education (National FFA Organization, 2015). One of the fastest growing demographic groups in the U.S. continues to be Hispanics. Nationwide, Hispanics accounted for 16% of the U.S. population in 2010, growing by 43% since the 2000 census. This growth accounted for more than half of the total U.S. population growth between 2000 and 2010 (U.S. Census, 2011). Since 1970, the Hispanic population has grown six-fold. Though the U.S. Census uses the term Hispanics, traditionally, Latino is considered more accurate, as most of the Hispanic population in the U.S. actually originated in Latin America (Oboler, 1995). Consequently, many who are classified as Hispanic may identify themselves as Chicana/Chicano, Latina/Latino, Mexican American, or other various classifications. More recently, the term Latinx has become more prevalent as a way to include all gender identities (de Onís, 2017). We choose to use the term Latino/a though we carefully assert the most appropriate terminology is self-selected by the individual.

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When addressing inequities in public education in the United States, Latinos continue to be a demographic group that require our immediate attention if we are to ensure a sound education for all of our nation’s students. Not only are Latinos the fastest growing demographic group in our country, Sólorzano, Villalpando, and Oseguera (2005) found Latinos were the group least likely to succeed in high school. Their study indicated only 10 in 100 Latino students would graduate from college, with just over 50% graduating from high school. Moreover, the gap between Latino and White students’ standardized test scores continues to be of concern as accountability in schools remains a hot topic in the national discourse (Good, Aronson, & Inzlicht, 2003). We also know that some teachers have lower expectations of their Latino students then they do of other student groups (Núñez, 2014).

Beyond the structural inequities in our nation’s schools, the Latino community faces many barriers outside of public education; the general impression of the public about Latinos helps put this issue in perspective. According to Chavez (2008), 30% of non-Latinos believe the majority of Latinos in the United States are illegal, while in actuality, 64% of Latinos are legal/U.S. born citizens. This inaccurate perception of Latinos by such a large portion of the non-Latino population, what Chavez terms the Latino Threat Narrative, helps perpetuate existing structural discrimination practices and mistrust as many associate the portrayal of illegal immigrants in the media with all Latinos. A related study by Rodriguez and Lamm (2016) found agriculture undergraduates’ colorblindness was a predictor of their attitudes toward undocumented immigrants. With so much negativity in the media, political climate and education, many Latino students begin to internalize and believe these stereotypes. Moreover, these students may also begin to adopt the beliefs of the dominant culture, accepting the view that all have an equal shot at being successful and success is in no way based on systematic and structural systems that lead to inequality (Núñez, 2014).

California remains an interesting case when examining the Latino experience. As of the 2010 census, California had the largest minority Latino population with over 22 million residents, followed by Texas with just over 13 million (U.S. Census, 2011). In 2012, Latinos became be the largest demographic sub group in California (U.S. Census, 2012) and the Pew Research Center found the ten counties with the largest Hispanic populations accounted for 22% of the national Hispanic population growth – five of these counties are located in California (Brown, 2014). While these data show the dramatic shifts taking place, we still have much to learn about the growing Latino population in our K-12 system, specifically, their experiences in Agricultural Education.

This study aimed to investigate Latino students’ experiences in California Agricultural Education. As such, the initial review of literature did not include an extensive investigation into the concept of privilege. We offer the following paragraph, post hoc, in hopes it will better situate the reader and provide a context for our findings. We further contextualize our findings in the conclusion of this manuscript.

The concept of privilege is based on an argument that counters a common American belief that we all have an equal shot at success. This belief often leads to structures that actually benefit those in the majority or who hold the most power. Institutional racism, or the current climate that privileges some over others in terms of race, tends to continue in perpetuity unless acted upon (Feagin, Feagin, & Feagin, 1986). Unfortunately, those oppressed by the current systems and structures often begin to believe they are lesser class citizens, at times failing to advocate for the changes necessary to break down the institutional racism that oppresses them. Concurrently, some believe we have reached equality in a modern colorblind society. Critical Race researchers seek to dispel this myth through scholarly work, stories, and social justice (Pyke, 2010), some of them taking a stand to shed light on the concept of privilege while actively seeking to dismantle it.
Theoretical Framework

Researchers of the transformative paradigm “explicitly position themselves side by side with the less powerful in a joint effort to bring about social transformation” (Mertens, 2010, p. 21). Moreover, these researchers take on the issues of groups that have been traditionally marginalized through oppression and structural inequity. Transformative researchers posit, while there are multiple ways of knowing, some ways are privileged over others. With this in mind, transformative researchers avoid the claim they can objectively examine certain phenomenon, rather, they explicitly acknowledge their social justice cause and seek research that will help address the plight of the oppressed. We are very careful to assert we approach this work without a deficit mindset; rather, we acknowledge our myriad privileges, particularly the privilege our race affords and the agency our academic degrees bestow upon us. In this study, we take a transformative stance with regard to the motivation and framework for this study.

We approached this study through the lens of Latino Critical Theory, also known as LatCrit, as it is a useful lens for examining the Latino experience in Agricultural Education. According to Villalpando (2004), LatCrit has an overarching goal of achieving and working toward social justice. Moreover, Solorzano and Bernal (2001) state, “LatCrit is concerned with a progressive sense of a coalitional Latina/Latino pan-ethnicity and addresses issues often ignored by critical race theorists” (p. 311). In this study, LatCrit will help frame the stories of the participants with an emphasis on intersectionality. Intersectionality refers to the interaction of several factors in critical and feminist theory, including race, ethnicity, gender, religion, socioeconomic status, sexual orientation, and others (Hancock, 2007). All aspects of students’ lives will impact their experience in Agricultural Education. From a critical perspective, LatCrit will help inform the stories and experiences of this study’s participants to help us gain an understanding from their own perspectives.

Purpose and Objectives

The original purpose the parallel mixed methods research that led to this manuscript was to explore Latino students’ experiences in California Agricultural Education. One of the major themes that emerged from the study was a perceived inequity between rural and non-rural students in three of the four original cases. This study aligned with Priority Area Four of the American Association for Agricultural Education National Research Agenda (Roberts, Harder, Brashears, 2016). The purpose of the study specific to this manuscript was to explore the concept of privilege as reported by the participants—specifically, what inequities do students perceive in their respective agricultural education programs between rural and non-rural students?

Methods and Procedures

This study was part of a larger, multi-objective, parallel mixed methods multiple case study (Creswell, 2013, 2014; Mertens, 2010). In order to conduct the multiple case study (Yin, 2014), an initial analysis was conducted of the California statewide data in order to find agriculture programs with Latino populations that were representative of each school’s Latino population. Also referred to as a multisite study (Creswell, 2013) or collective case study, this method allows for the examination of several cases in order to allow a deeper understanding of a certain phenomenon (Berg & Lune, 2008). The larger study (see Elliott, 2014) sought to investigate Latino students’ experiences in California Agricultural Education. The quantitative portion of the study included an investigation of student demographics, motivation, and career goals in four agricultural education
programs. For the qualitative phase of the study, a small focus group comprised of a group of five to seven students of Latino ethnicity was conducted at each of the four programs. The focus groups were approximately one hour in length. Questions were open-ended and were designed to elicit the participants’ experiences in their respective programs. Questions and potential follow up questions were approved in advance with each school site as part of the overall IRB approval, which also included student assent and parental informed consent. Additionally, recruitment documents and parental information forms were provided in both Spanish and English, though the students who participated in the study all spoke proficient English.

Selection of Cases

Each of the four original cases were selected based on demographic and geographic similarities. All four sites had a large percentage of Latino students and were all located in the Central Valley of California. Moreover, each of the programs is known in the state as being successful, though we do recognize this is a very subjective definition. For this study, one of the schools was not included in the analysis as the school’s students are primarily non-rural, and as such, students did not share examples of inequity or privilege related to being rural or non-rural.

Participant Selection

We chose our participants at each school site purposively to ensure a more heterogeneous group (Berg & Lune, 2008). We asked the agriculture teachers at each site to assist with selecting students who were of Latino descent, varied in terms of their participation level in the program, and who were upperclassmen. Table 1 shows the demographics of the participants, though it should be noted only the participants whose comments were used in this manuscript are included in the table. The original research included eighteen participants in the three cases selected for this study. Berg and Lune (2008) argue the importance of focus groups as a tool for answering a research question. Moreover, focus groups, generally consisting of less than seven participants, allow for the social aspect of data collection, where participants can build upon others’ comments. All of the students communicated proficiently in English, though some indicated they were bilingual.

Data Analysis

As the data collection in this study was situated in a much larger investigation, the specific analysis of the data related to this study become important for transferability. Each of the focus groups was transcribed word for word and was analyzed using an open coding process (Creswell, 2012). Pseudonyms were inserted to protect the individual identity of the participants, schools, and teachers. Initially, each case was analyzed independently for emergent themes. Analytic notes were used to capture the researchers’ thoughts and feelings throughout the data analysis. Next, cases were combined and a cross case analysis was conducted to provide the overall Latino experience across cases. Each case was analyzed for themes, then the themes of each case were examined to determine any themes that transcended all of the cases (Yin, 2014). One of the emergent themes that transcended three of the four cases was the perceived privilege that rural students tended to have over non-rural students. The data from this major theme was further analyzed for this sub-study, and upon reviewing the initial transcripts, three sub themes surfaced, supported by thick, rich descriptions.
Confirmability and dependability were established through the use of peer debriefing, field and analytic notes, and maintaining a clear data trail. All recordings, transcripts, and field notes have been blinded and securely saved in order to ensure they are traceable. Triangulation was ensured through the use of multiple cases, two researchers, and use of field notes (Lincoln & Guba, 1985). It is up to the consumer of case study research to decide the extent the data can be generalized and transferred (Lincoln & Guba, 1985). Merriam (2009) adds “the more cases included in a study, and the greater the variation across cases, the more compelling an interpretation is likely to be” (p. 49). We have attempted to provide future researchers the context they need in order to determine the applicability of this study’s findings to other cases.

**Limitations**

Several factors limit our ability to generalize the findings of this study. Conducting four small focus groups, while providing us with profound insight, may have missed important details that would emerge in a more comprehensive study. Moreover, this study was originally designed to investigate the Latino experience in Agricultural Education, and therefore, may be missing important details that would emerge in a study designed to specifically address the issue of privilege. It should also be reemphasized that the study was limited to Latino students, so our findings can only apply to a particular ethnic group. While the findings are useful to our field, more investigation must be done to determine if our findings are independent of race or ethnicity. Though this study began to answer questions we did not originally aim to ask, we have made every attempt to account for these limitations in our analysis, findings, and conclusions.
Findings

Three of the four cases in the multiple case study presented findings indicating a rural and urban divide among students in each of the four agriculture programs. The three programs, Central High School, Georgia High School, and Ocean High School, were all made up of students from both urban and rural settings. Washington High School’s students were primarily comprised of students who resided in the city, and as such, no findings are reported which would support a difference in privilege between urban and rural students. While the overall study produced several themes, this manuscript explores the major theme of rural privilege, which is dissected into three sub-themes: 1) Students from non-rural backgrounds may not possess the same understanding of agriculture and agricultural education as their urban counterparts; 2) Lack of privileged information may present a barrier to access, enrollment, and involvement in secondary agricultural education programs; and, 3) Students from non-rural backgrounds tend to report fewer opportunities and more barriers to fully actualizing the three-circle model.

1. Students from non-rural backgrounds may not possess the same understanding of agriculture and agricultural education as their urban counterparts.

The students who participated in the study shared how their exposure to agriculture was limited due to their urban upbringing. Andrea shared her experience moving from a large city to a small community in an agricultural region.

For me honestly, I came from a big city. You don't see a lot of it unless you go well into the freeway...so honestly I had no clue what it was until I moved here. I moved here my freshman year, so I was curious as to what it was (CHS, Andrea, 127-131).

Ethan had a similar story.

One of the challenging things was I grew up in the city. I’m a city kid and I thought ag was just a country program and I didn’t think I was going to have this much opportunities as people who already enrolled in ag, it was really hard (OHS, Ethan, 144-145).

Like Andrea, Diego also moved from a big city.

When I moved here, I didn’t know corn grew... I didn’t know that walnuts came from trees, and I met all these people and a lot of my friends are farmers. I have been able to learn about how things work with farming and how important it is to our country. It is basically the backbone of the United States because everybody needs food. Agriculture is not just about food either. There is a horticulture thing and I think the cool thing about ag here in this program, that we... it is not just about one thing. There is a little bit for everybody (GHS, Diego, 25-31).

Ian expanded on Andrea’s comments, explaining the divide between those who grew up in rural environments versus the majority of youth who now grow up in the city.

It's almost as if you were to look at most teens today, we're a lot more distant from agriculturally based things. And so, when we come, and we see these classes, then they have more appeal because they're almost novel to us, just as our generation as a whole. It's just looks more, like I said, exposure to it because we've grown distant.
from it. That's probably the biggest contributor to why it seems like fun (CHS, Ian, 243-248).

Andrea continued, sharing her parents’ disconnect from agriculture.

I'm actually the first one in my family; I would say my immediate family at least to be a part of ag, like an ag, any type of ag profession. So they're really actually proud of it, and they kind of boast about it in a way. Like, 'look at all the success that she's achieving in ag.' It's like something that honorable to them because none of my parents work in dairies. (CHS, Andrea, 426-431).

2. Lack of privileged information may present a barrier to access, enrollment, and involvement in secondary agricultural education programs.

Throughout each focus group, students shared how the disconnect between agriculture and city students may be a barrier to enrolling in a secondary agriculture program. Moreover, city students may not participate at the same level as rural students.

I think really that's mainly the problem. I feel like people who are like, maybe like grew up or family in ag, or they come from an ag background, and kids like me who come from the city and have no idea what ag was. I feel like that's where the barrier is, or people maybe don't want to join because kids like me, they don't see me as a person who would run for officer team, or they don't see me as the one thriving in FFA. Like I feel like they see that, and they look down on you if you don't have any type of agricultural experience, or if part of your family is in agriculture because I feel like people who are, who have people like ‘my parents own a dairy,’ blah, blah, blah, those people. They're kind of held up on a pedestal (CHS, Andrea, 528-537).

Adrian had similar thoughts.

In eighth grade, I hung out with what you might call the popular kids, so when this program called Future Farmers of America came they were like, ‘you want to be a farmer? That is stupid.’ I’m like ‘yeah, I’m too cool for that...’ but once I started high school and my friend was like ‘oh yeah, we’re building this and that,’ I was like ‘how come they didn’t tell me about that.’ I would have chosen it if I would have known what they were doing to begin with. Now that I’m a junior and I’m going to turn into senior year, a lot of my friends are like ‘dang, I wish I would have got involved in the FFA program earlier if I would have known that you guys get to build stuff and you get to work with your hands’ (GHS, Adrian, 1064-1072).

To address some the lack of knowledge, the students expressed the need for more education and awareness—for potential students and parents alike. “Not many people know what it's about. They hear about it, but don't really know, like hey, this is what it's about. So, it's gaining popularity, but I feel like it should have way more than what it does now” (CHS, Andrea, 917-920). Ian agreed. “It definitely is exposure, but I would like do something like, oh, just have the ag kids go in and present to other students” (CHS, Ian, 922-924). Additionally, Ian indicated the parents needed to be better informed as well, particularly about what the program is and how it works. “Parents as well are also greatly misinformed. That probably goes back to past stigmas against farm workers or things like that. Just a lot of things can contribute and stack against it” (CHS, Ian, 942-944).
3. Students from non-rural backgrounds tend to report fewer opportunities and more barriers to fully actualizing the three-circle model.

As a 100% membership state, all students in California Agricultural Education are paid FFA members, but students in the study reported barriers to being involved beyond the classroom. When the issue of race and ethnicity surfaced in the discussion, Adrian described city students as the average Joes in his agriculture program.

It is more of an average Joe and country person type of deal. For example, you could be any color, but if you are not used to doing agriculture or being on a farm or raising an animal, you are not motivated. You are not engaged in the agriculture program just because the average Joe is not necessarily targeted. It is more of the country folk, or the people that are involved (GHS, Adrian, 834-838).

Lucas felt the differences in opportunities were based on popularity, noting many of the popular students at his school were from the country.

... involvement goes with social class at school, because if you are popular, you are not going to be made fun of. But if you’re down there, you would be made fun of. People are going to think it is dumb, but you know how being popular, when one person does it, everyone else does it. That is my feel (GHS, Lucas, 848-851).

Responding to Lucas, Javier credited most of the popularity some students enjoy to the fact they have known each other for so long.

I think the FFA program, it is like you’re coming into a family that you’re not used to and you feel that you wouldn’t fit into, so then a lot of the country people in this town, they’ve known each other their whole life. They have been raised... they grew up together... they grew up on farms and stuff like that. So then, you feel like you are walking into family that you do not think you will fit into (GHS, Javier, 870-874).

Diego said the rural students had more opportunities due to the resources of their families.

I think the opportunity things... I think the people whose parents’ are farmers, generally do have more opportunities because they have the money to back up certain SAE projects, the time, and the space because most of them live out in the country. I am not saying that it is not fair, because you are supposed to deal with the cards you are dealt with (GHS, Diego, 121-123).

Adrian felt the advantage rural students enjoyed was real, but recognized some students may be internalizing their disadvantage.

It’s like sometimes you just get... it’s an advantage to them because they grew up their whole life being a part of agriculture, and then all of a sudden you just come in and...It is not necessarily a big factor, but sometimes it does... you feel like it does exclude you from certain things, or from getting certain opportunities. But I think it’s just something that... it’s in the back of our heads and maybe it’s not necessarily what we think it is (GHS, Adrian, 108-114).
Ricky felt those on farms, the owners, had more money which could help support some students in the program, and shared he didn’t have those same opportunities.

Those who live on a farm are the ones who do have farms, but if you are working for another company, you are really not making as much money as like those who own a farm; because my grandpa does not make a lot of money. We do not live out on the farm with a big piece of land. We live here in the city with a small house (GHS, Ricky, 128-131).

Diego indicated the perception that country kids had an advantage made him want to work harder.

I think students do have a big part because you have these kids from the country and they think they are better than you and so you have to prove yourself. That is how I deal with it, I just prove myself. I prove that I can do this job better than you (GHS, Diego, 361-363).

Rosa agreed, and shared how one of her country friends approaches it.

I can see where they’re coming from, where they say they want to do better, because I have friends who are in ag and they grew up on farms, and I hang out with this girl in my fifth period, and she’ll be like ‘yeah, these kids, they don’t know what they’re doing.’ And she grew up on a farm all her life, so of course she’s going to say that. So, I see where they’re saying they want to go above it, but I’m just like, calm down. She is like making it sound like she is better, and I’m like ‘well, you’ve had your whole life. These kids could probably be as good as you and you’re just like no, I grew up on a farm, I know what I’m doing’ (GHS, Rosa, 385-391).

Ricky felt the country versus city divide was bigger in certain courses in his agriculture program.

I feel like the classes that we have, like the ornamental horticulture, those are... I feel like it’s beginning ag type of stuff, and then ag mech is like that hard-core type of ag where all these country kids are in there so, I feel like that’s why you guys say you see it more, because that’s like the higher up ag (GHS, Ricky, 652-655).

Diego agreed.

Yeah, and they are straight from... they grew up doing that stuff, so I feel like that is... they have the mental image or whatever you guys are seeing. I feel like you are going to get that more in that class, because those kids grew up doing it. And then our class is just like ‘oh yeah, let’s go plant flowers, we’re beginning ag...’ don’t get me wrong, I like the class, I’m just saying they have a class that has more kids who have done it for a long time (GHS, Diego, 659-663).

Adrian had two classes where he could see a difference based on the concentration of country kids.

Yeah, I have both classes. I have ag mech first and then I have ornamental horticulture second, so sometimes it is like a major shift from how you feel that
you are looked at. In ag mech, I might feel like I have to prove myself, while in ornamental horticulture, it is just whatever (GHS, Adrian, 665-668).

When asked why more Latino students don’t run for chapter leadership positions, students indicated they felt they had a slim chance due to the “country kids” knowing each other prior to being the agriculture program. According to Rosa, “it is a family. You have to think about it that way. You won’t get as much votes because they don’t know who you are because you’re coming into a system where they’ve all been raised... they all know each other” (GHS, Rosa, 915-917). Rosa continued.

I know there is like eight kids that I knew and they are all cousins, they are all related. It is weird because you come into the ag program and you might be the only one; and you are competing with these kids who have known each other their entire lives because they’re related, or they grew up with each other because their parents all do the same thing. It is hard to be able to run because these kids are the more popular kids, so they are automatically going to want to vote for the more popular kid because they think they are capable of more and they create a better image for the FFA (GHS, Rosa, 924-930).

Others also shared the limitations experienced by non-rural students in their program.

Most of the kids who are officers, they had family, brothers and sisters who were officers so they’re like ‘oh I want to be that,’ but kids like us who come in like, we’re not really caring about that, we’re really taking advantage of the other opportunities (OHS, Ethan, 1142-1145).

David agreed. “They kind of have a little more of head start than you do” (OHS, David, 1151).

Yeah. So it’s like it’s harder for you to—even if I try to run as an officer or anything like when you’re running up against a person who was an officer last year and was White but you don’t get your name out there because they were already there last year (OHS, David, 1166-1168).

Emma thought they had more popularity and experience. “I think it has to do with the fact that they have their name out there. I mean if you look at our officers most of them they’ve had their SAE projects since freshman year” (OHS, Emma, 1189-1190). Ethan agreed.

Despite some challenges, Sofia was happy the city versus country issues didn’t necessarily limit what she could do in the program.

Emma agreed, indicating she thought the divide was improving in her program.

I think what really helped is that we start seeing how not only a lot of country people, but at the same city people can all do the same similar things. Like you don’t have to live in the country to be able to be involved in programs that are as inspiring as FFA is. So, I think people just finally realized...why are we worried about discrimination when we could be doing something we actually really love. So, I just hope everyone else can see it that way too (OHS, Emma, 307-311).
Discussion

While the original multiple case study aimed to investigate the Latino experience in California Agricultural Education, the emergence of the major theme relating to rural students having privilege over non-rural students warranted further analysis—as such, we presented three sub-themes to further explore the phenomenon. As noted in the limitations, the study did not aim to investigate privilege; however, the wide-angle lens we examined the original data through presented a case for telling our participants’ full stories. We purposefully approached the original study with ethnicity in mind, and while the participants’ Latino backgrounds limited the generalizability of our findings, we would argue privilege, as experienced from any student demographic, should still be of concern in Agricultural Education if we seek to foster equity in our programs.

As the results of our study began to shed a light on the opportunities some rural students have over non-rural students, we returned to the literature, and found little mention or discussion of the concept of rural privilege, though Martin and Kitchel (2014) do examine urban students’ barriers to participating in the National FFA Organization. The students in our study tended to share their experiences in the entire agricultural education program, and as such, we offer our own working definition of *Rural Privilege* to describe the inherent structural advantages students from rural areas tend to have over students in urban areas with regard to their ability to thrive in Agricultural Education in California. Given the context of this study, we only apply this definition in conditions where rural students intersect with city students in the same program, giving one group privilege over the other. This differs from other discussions of rural privilege, for example, as described by Kathleen Budge (2006) who conducted a case study of three rural communities in southwest Washington. Her study examined these small rural communities, but did not address the educational setting where urban and rural students coexisted as in our study. Moreover, Budge was focused on the overall lifestyle of the rural communities in her study.

We apply the term *Rural Privilege* to the experience some students face in Agricultural Education in a context including several or all of the following conditions: 1) rural students who have parents or family members who were in an agriculture program themselves, giving them additional knowledge and connections other students may not have; 2) rural students whose family has the financial means and space to engage in larger SAE projects and advanced agricultural mechanics courses, if applicable, where investment in large projects is costly; 3) students who are part of a rural community where other students and their families tend to know each other prior to their enrolling in the agriculture program; and 4) rural students’ and their family’s experiences and knowledge, particularly in production agriculture, that may give them an advantage over urban students. Though privilege has historically been tied to race, we do not explicitly make that connection here, as our data does not present us with enough evidence to make this claim; however, future research should explicitly account for race and ethnicity as a possible characteristic of *Rural Privilege*, particularly as we acknowledge that “Agricultural Education” has historically been a white endeavor. While student demographics continue to diversify, much of the way we do business still privileges students from the dominant culture over others. Once such example would be the analysis of the when the New Farmers of America (NFA) was combined with the Future Farmers of America (FFA). We often teach students that there was a merger of the two organizations in 1965; however, when closely examining the traditions, logos, and history we must acknowledge that the term “merge” is not the most accurate term to describe how the two organizations were combined. Consequently, it should be no surprise there has been a lack of Black leadership in the National FFA Organization since the merger (Wakefield & Talbert, 2003).
We are extremely careful not to assert all rural students are Rurally Privileged, rather, there are certainly conditions where very few of the defining characteristics may exist in certain rural settings. For example, as poverty is pervasive in certain rural areas, we would certainly not assert these students are privileged because of their being rural. Moreover, there are certainly city students who may have some of the advantages privileged rural students have, including having the financial means to participate in out of class activities and parents who are alumni of the agriculture program and who are well-connected in the community. More research should be conducted to explore this concept in other settings with students from other ethnicities and races. We would, however, propose Rural Privilege could envenom existing structural racism issues.

Recommendations

As we presented earlier, our bias is rooted in a philosophical belief that equity in our agriculture programs is a lofty yet necessary pursuit. While Agricultural Education is making strides in this endeavor, we call for our profession to pursue true equity in our programs, as we believe an equal for all approach disproportionally benefits those with institutional privilege. Agricultural Education is rapidly approaching Diversity in many schools, where the memberships and enrollments mirror the overall school’s population. However, diversity does not ensure inclusivity or equity, so we must ensure as diversity increases, we are ensuring equity for students from historically marginalized groups. If we are to argue our programs are fair to all students, arguing “any student may apply for chapter FFA office,” then we privilege those who may have the family background, resources, and institutional knowledge that would present an advantage over an otherwise equally talented student who does not. An equity lens takes these inherent privileges into account and may drive us to develop policies such as limiting FFA officer election campaign materials, thereby addressing the inequality that may exist in terms of students’ financial resources.

While we cannot offer more than our findings and a call for our profession to continue to investigate these issues, we do believe our colleagues in the classroom will be an important part of the discourse. How is inequity and privilege addressed in diverse programs across the nation? How do we address the inequities that exist between programs? In terms of Supervised Agricultural Experience Programs, should we continue to assert that non-rural students can engage differently, pursuing an agriscience research project for example, or should our profession work to provide opportunities that rural students might enjoy such as raising livestock? Many programs address this inequity through school learning labs, but is this enough? How do we better prepare students and their parents who do not have a legacy of involvement in Agricultural Education or who may not come from an agriculture background? Are we content to accept that some students may thrive in our programs with an un-earned privilege over others? As researchers and philosophers, we must ask ourselves if these realities just are what they are, or are they examples of structural inequities, exacerbated by our deeply rooted traditions and business as usual approach—a mindset that continues to serve the dominant culture. Let us be clear, we simply ask these questions in hopes that our profession will continue the investigation and dialogue.

Teacher education programs should purposefully address the concept of Rural Privilege in their curriculum in order to prepare our future practitioners for a more diverse student population. Moreover, beyond asking these questions and designing studies to specifically address this phenomenon, future research should investigate the strategies Agricultural Educators are already implementing to address these concerns in their classrooms and programs. Furthermore, we should investigate the implications of privilege, or lack thereof, in terms of students’ successes in Agricultural Education—and we must ask the obvious question, what role does race, gender, class, and ethnicity still play in terms of privilege and student achievement in our programs. We believe
continuing these investigations will yield a more robust and dynamic iteration of our proposed
definition on Rural Privilege and move our profession closer to the pursuit of true equity for all of
our students.

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Student Perceptions of Workforce Readiness in Agriculture

Rachel Hendrix¹ & Carley C. Morrison²

Abstract

The purpose of this study was to examine postsecondary agriculture students’ perceptions of and their personal competence in various workforce readiness skills. In addition, we sought to determine students’ views of the importance of workforce readiness skills. The findings indicate that the participants felt most confident in their abilities to work independently and without supervision, demonstrate loyalty, and act in a manner that displays responsibility and respect for others. They felt least confident in all areas of communication, but especially in written formats such as formal reports and documents. Rankings of skill importance revealed that participants believed maintaining harmony in the workplace and building positive relationships were considered to be most essential, with personal responsibility and communication close behind. Finally, an analysis of entry-level job announcements indicates that the skills most sought by employers include communication, teamwork, attitude, creativity, flexibility, and independence.

Keywords: workforce readiness, student perceptions, employer demands, behavioral skills, soft skills, career readiness, agriculture industry, career preparation

Introduction

If the United States is to continue feeding and clothing an ever-increasing population, it is essential that today’s college students be properly prepared to fill the agricultural jobs of tomorrow (Goerker, Smith, Fernandez, Ali, & Goetz, 2015). Recent trends have revealed that employers seek graduates who leave their college or university prepared not only with career- or situation- specific technical skills, but also with higher-order behavioral skills that can be applied to many different needs, issues, and careers (Bentley University, 2014; Casner-Lotto, Barrington, & Wright, 2006; Landrum, Hettich, & Wilner, 2010; Paranto & Kelkar, 2000; Partnership for 21st Century Learning, 2015; Rateau, Kaufman, & Cletzer, 2015).

Unfortunately, a gap exists between the workforce readiness expectations of future employees and their employers (Casner-Lotto, Barrington, & Wright, 2006; Jaschick, 2015; McNamara, 2009; Robinson & Garton, 2008). Employers report that recent college graduates do not possess the transferrable, higher-order skills necessary for workplace success, and that as a result they are essentially unprepared to become productive employees (Robinson & Garton, 2008). Research indicates that few young people recognize the value of higher-order behavioral traits and

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skills in general, and that many believe technical skills are more important to possess and display (Bentley University, 2014; Dunne & Rawlins, 2010).

In addition, many graduates also find themselves overestimating the extent of their own behavioral competencies (AACU, 2015; Bentley University, 2014; Jaschick, 2015). A 2013 study commissioned by educational company Chegg noted that while 50% of surveyed students believed themselves to be “completely or very prepared for a job in their field of study,” only 39% of employers could say the same about recent graduates they had interviewed for job openings (p. 3). The survey also found large disparities between students’ and employers’ views of students’ financial planning, prioritization, management, and communications skills (Chegg, 2013). Another survey from the American Association of Colleges and Universities (2015) also found that employers placed higher value on written and oral communication, teamwork, ethics, decision-making, critical thinking, reasoning, and knowledge application than students did.

Regarding the agriculture industry, Dailey, Conroy, and Shelley-Tolbert (2001) explored how secondary agricultural education can be used as a context for teaching life skills such as “public speaking,” “communication,” “leadership,” and “responsibility and dedication” (p. 16) that have been “identified as crucial for the workforce” (p. 11). Robinson and Garton (2008) assessed the employability skills of graduates from the University of Missouri’s College of Agriculture and Natural Resources and identified that the ability “to solve problems, work independently, deal with stress, stay positive, and listen” were seen as key qualities to workplace success (p. 102).

Through 2020, 58% of projected agricultural job openings are expected to be agricultural business, education, communication, management, or governmental positions that actively require higher-order behavioral, interpersonal, leadership, and decision-making skills (Goerker et al., 2015). In order to succeed in these future agricultural careers, students must not only possess vocation-specific capabilities, but also master such abilities as critical thinking, leadership, teamwork, communication, creativity, adaptability, and accountability (Bentley University, 2014; Casner-Lotto, Barrington, & Wright, 2006; Landrum, Hettich, & Wilner, 2010; Paranto & Kelkar, 2000; Partnership for 21st Century Learning, 2015; Rateau, Kaufman, & Cletzer, 2015).

Yet the question of who is responsible for teaching these skills remains (McNamara, 2009). Many employers believe the duty falls upon America’s colleges and universities (AACU, 2015; Robinson & Garton, 2008). However, many of these same employers do not feel as if current models of employee preparation regarding behavioral skill development are working (Career Builder, 2017; Robinson & Garton, 2008). In a 2017 survey of over 2,300 hiring professionals, employment company Career Builder found that academic institutions placed “too much emphasis on book learning instead of real-world learning,” (para. 12), and that students needed “a blend” of technical and liberal arts skills. As careers and technology become increasingly more complex (Career Builder, 2017), it is essential that educators understand the needs and desires of today’s workforce as well as the relative readiness of future employees, and also identify methods through which vital behavioral skills can be most effectively taught.

**Theoretical Framework**

This study is based upon the Human Capital Theory, which was largely developed by economist Gary Becker. Human capital has been defined as an investment in “the abilities and qualities of people that make them productive” (Gary Becker’s Concept, 2017, para. 3). While there are many factors that can impact a person’s productivity, one’s knowledge is usually considered to be the most influential. Becker (1993) wrote that “education and training are the most important
investments in human capital” (p. 17), and van Loo and Rocco (2004) stated that human capital was “an investment in skills and knowledge” (p. 99).

Human capital is divided into two varieties: specific and general. Specific human capital is “knowledge directly tied” to one’s workplace, and is thus non-transferrable from career to career (Gary Becker’s Concept, 2017, para. 7). As such, employers are usually willing to train employees in such knowledge as a means of improving employee productivity. However, general human capital is more nebulous, and can often be learned from and applied across many different locations, experiences, and industries. As such, many employers expect new hires to proactively exhibit human capital skills, regarding the teaching of such while on the job as a waste of time, effort, and resources.

The workforce readiness competencies studied in this research can all be considered general human capital, as they can be learned through many different channels and applied in myriad ways. By understanding how secondary and postsecondary educational opportunities can invest in human capital through the impartation of vital knowledge and skills, it is possible to create a workforce that is not only more valuable and desirable to employers (Paranto & Kelkar, 2000), but also better equipped to face the challenges that arise in everyday life.

In addition to the Human Capital Theory, the Employability Skills Framework developed by the United States Department of Education’s Office of Career, Technical and Adult Education was also used to provide a theory base for this study. According to the framework, skills fall into 3 categories: applied knowledge, effective relationships, and workplace skills.

Applied knowledge is defined as “the thoughtful integration of academic knowledge and technical skills, put to practical use in the workplace” (U.S. Department of Education, 2017). This category involves students using reading, writing, mathematical, and scientific principles to understand the world around them and become productive employees and members of society. It also includes the use of critical thinking and decision-making skills in organizational, analytical, and problem-solving activities.

Effective relationships involve using “a combination of interpersonal skills and personal qualities” to build positive and collaborative understanding between employees, employers, and customers (U.S. Department of Education, 2017). Interpersonal skills focus on concepts such as communication, teamwork, attitude, and motivation, and personal qualities include professionalism, responsibility, flexibility, and integrity. Knowledge of the needs and emotions of oneself and others, as well as an understanding of cultural differences fall into this category.

Workplace skills “are the abilities employees need to successfully accomplish work tasks” (U.S. Department of Education, 2017). This category covers a wide range of competencies including management of time and resources, communication across many formats, and in recognizing and understanding how systems function and operate. This category also includes the implementation and application of emerging techniques and technologies.

**Purpose and Objectives**

Studies show that graduates, at large, do not value these skills and even overestimate the level at which they competently display them (Bentley University, 2014; Casner-Lotto, Rosenblum, & Wright, 2009; Casner-Lotto et al., 2006; Coplin, 2004; Jaschik, 2015; NACE, 2016). Previous studies have examined this issue in other career fields, (Hickey, 2009; Hodge & Lear, 2011; Kaminski, Switzer, & Gloeckner, 2009; Kavanagh & Drennan, 2008; Landrum et al., 2010), but
little has been done to examine the self-perceived behavioral skill competencies of agriculture students. If colleges are to adequately prepare students for their future careers in the agricultural industry, it is important to first understand how these students view their own levels of workplace readiness, and how such views relate to the expectations and needs of the modern workforce. Such a disparity in the definition of workforce readiness has made this issue an important priority in the American Association for Agricultural Education’s National Research Agenda (AAAE, 2016). This study intends to explore college agriculture student perceptions of workforce readiness skills and identify possible methods through which these skills might be taught. The following research objectives guided this study:

1. Identify agriculture students’ perceptions of their personal workforce readiness.
2. Identify agriculture students’ perceptions of the importance of workforce readiness skills.
3. Identify skills sought by employers in the American agricultural industry by examining entry-level position announcements
4. Identify methods through which students might learn and develop important workforce readiness skills

Methodology

Participants in this study \( (N = 59) \) were members of two undergraduate agriculture classes in the School of Human Sciences at Mississippi State University. Both classes focus on teaching students behavioral and communication skills they will need in their professional careers. All participants were offered five extra credit points in their class for completing the survey.

This study utilized a survey instrument originally developed by Landrum et al. (2010) to examine workforce readiness perceptions of Boise State University psychology graduates. Two experts in the field of agriculture education examined the instrument for relevancy to the agriculture industry, and ultimately recommended that, as the items were applicable to many career areas, no changes be made regarding item content. However, references to participant competency levels at the time of or after graduation were removed, as this study examined current university students instead of graduates. Reliability coefficients were not calculated for the instrument, as its intent was “not to create a scale where individuals receive scores that predict future preparedness or competence,” but to understand “multiple individual ideas and emotional qualities rather than broad concepts and factor analyzed outcomes” (R.E. Landrum, personal communication, April 10, 2018).

Section I of the instrument provided respondents with 54 skills related to workforce readiness. Sample items included “work well with others,” “identify, prioritize, and solve problems,” “present information verbally to others,” and “possess the ability to work without supervision.” Participants were asked to rate their current perceived levels of competence regarding each item along a 3-point scale, with 1 = low and 3 = high.

Section II of the survey asked participants to look back at the items in Section I and list which skills most important to success in the workplace from 1 = most important and 10 = least important. From this, two lists of students’ most important behavioral skills were derived. In addition, participants were asked to provide possible activities (either academic or non-academic) that might help a typical undergraduate student develop each of their top 10 behavioral skills.

Section III of the survey collected demographic information from participants such as age, gender, ethnicity, major, and planned post-graduation career field. IRB approval was obtained prior to data collection. Students were asked to sign a consent form before the questionnaires were
distributed. Class time was provided for participants to complete the instrument. Data were analyzed using descriptive statistics including means, standard deviations, and frequencies.

In addition to the survey instrument, 50 job announcements from all across the United States were reviewed to formulate a list of behavioral skills sought by employers in the agriculture industry. Job announcements were collected from AgCareers.com, AgHires.com, and the National FFA Organization’s Employment Skills Leadership Development Event. All announcements were examined by the researchers and selected for their relevance to the agriculture industry and their appropriateness for recent university graduates.

Results

Student participants (N = 59) ranged in age from 20 to 50 years old (M = 22.10, SD = 3.89), with 42 men (71.2%) and 16 women (27.1%). One respondent chose not to identify their gender. The majority of respondents were White (93.2%). Ninety-four percent of students (n = 55) were pursuing an agriculture-related degree at the time of the survey, and 84% (n = 50) indicated that they would enter an agriculture-related career upon graduation.

Objective 1

Section 1 of the survey asked students to rate their perceived levels of competence regarding 54 behavioral skills deemed as useful in the workplace. Respondents rated each item using a scale of 1 = low and 3 = high. Table 1 is sorted in descending order based upon students’ perceptions of their competence in each area.

Table 1

Means and Standard Deviations of Workforce Readiness Items (N = 59)

<table>
<thead>
<tr>
<th>Workforce Readiness Items</th>
<th>Student Level of Competence</th>
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<tr>
<td></td>
<td>n</td>
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<tr>
<td>Work without supervision</td>
<td>59</td>
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<tr>
<td>Demonstrate loyalty to the organization and its goals</td>
<td>59</td>
</tr>
<tr>
<td>Work independently</td>
<td>59</td>
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<tr>
<td>Act responsibly and conscientiously</td>
<td>59</td>
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<tr>
<td>Appreciate the importance and value of humor at work</td>
<td>59</td>
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<tr>
<td>Teach and learn from others on the job</td>
<td>59</td>
</tr>
<tr>
<td>Appreciate the need for organization, supervision, policies, and procedures</td>
<td>59</td>
</tr>
<tr>
<td>Possess self-discipline, including punctual attendance and dependability</td>
<td>59</td>
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<tr>
<td>Take steps to achieve career goals</td>
<td>59</td>
</tr>
<tr>
<td>Handle conflict maturely</td>
<td>59</td>
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Table 1 (continued)

Means and Standard Deviations of Workforce Readiness Items (N = 59)

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<tr>
<th>Workforce Readiness Items</th>
<th>Student Level of Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>Show respect for the opinions, customs, and individual differences of others</td>
<td>59</td>
</tr>
<tr>
<td>Possess the ability to work under supervision</td>
<td>59</td>
</tr>
<tr>
<td>Assist in continuous improvement</td>
<td>59</td>
</tr>
<tr>
<td>Demonstrate pride in accomplishment</td>
<td>59</td>
</tr>
<tr>
<td>Possess a positive attitude towards work</td>
<td>59</td>
</tr>
<tr>
<td>Identify, prioritize, and solve problems</td>
<td>59</td>
</tr>
<tr>
<td>Demonstrate initiative, motivation, and perseverance</td>
<td>59</td>
</tr>
<tr>
<td>Work well with others</td>
<td>59</td>
</tr>
<tr>
<td>Meet the needs of others, such as clients or customers</td>
<td>59</td>
</tr>
<tr>
<td>Manage several tasks at once</td>
<td>59</td>
</tr>
<tr>
<td>Monitor progress towards goals</td>
<td>59</td>
</tr>
<tr>
<td>Participate in reaching group decisions</td>
<td>59</td>
</tr>
<tr>
<td>Understand how the work flows through the system</td>
<td>59</td>
</tr>
<tr>
<td>Receive and use both positive and negative feedback</td>
<td>59</td>
</tr>
<tr>
<td>Respond appropriately to constructive criticism</td>
<td>59</td>
</tr>
<tr>
<td>Consider and evaluate alternative solutions</td>
<td>59</td>
</tr>
<tr>
<td>Set priorities and allocate time efficiently in order to meet deadlines</td>
<td>59</td>
</tr>
<tr>
<td>Provide leadership and followership as appropriate</td>
<td>59</td>
</tr>
<tr>
<td>Contribute ideas and answers to solve problems</td>
<td>59</td>
</tr>
<tr>
<td>Determine the costs, time, or resources necessary for a task</td>
<td>59</td>
</tr>
<tr>
<td>Gather information effectively</td>
<td>59</td>
</tr>
<tr>
<td>Make defensible/appropriate decisions</td>
<td>59</td>
</tr>
<tr>
<td>Function effectively in stressful situations</td>
<td>59</td>
</tr>
<tr>
<td>Motivate oneself to function at optimal levels of performance</td>
<td>59</td>
</tr>
<tr>
<td>Demonstrate self-motivated learning</td>
<td>59</td>
</tr>
</tbody>
</table>
Table 1 (continued)

Measures and Standard Deviations of Workforce Readiness Items (N = 59)

<table>
<thead>
<tr>
<th>Workforce Readiness Items</th>
<th>Student Level of Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>Give direction and guidance to others                                                   59</td>
<td>1.38</td>
</tr>
<tr>
<td>Apply knowledge from formal educational experiences                                      59</td>
<td>1.37</td>
</tr>
<tr>
<td>Apply thinking/problem-solving skills to technology situations                           59</td>
<td>1.37</td>
</tr>
<tr>
<td>Evaluate own interests, strengths, and weaknesses                                        59</td>
<td>1.35</td>
</tr>
<tr>
<td>Understand simple probability and statistics                                             59</td>
<td>1.33</td>
</tr>
<tr>
<td>Interpret charts, tables, and graphs                                                    59</td>
<td>1.33</td>
</tr>
<tr>
<td>Organize information in a logical and coherent manner                                    59</td>
<td>1.33</td>
</tr>
<tr>
<td>Demonstrate highly-developed social skills                                              59</td>
<td>1.32</td>
</tr>
<tr>
<td>Regulate your emotions effectively                                                      59</td>
<td>1.25</td>
</tr>
<tr>
<td>Identify and resolve sources of conflict between oneself and others, or among other people</td>
<td>59</td>
</tr>
<tr>
<td>Adapt to change                                                                          59</td>
<td>1.23</td>
</tr>
<tr>
<td>Recognize the political and ethical implications of decisions                           59</td>
<td>1.23</td>
</tr>
<tr>
<td>Accurately monitor others’ emotional states                                              59</td>
<td>1.23</td>
</tr>
<tr>
<td>Present information verbally to others                                                   59</td>
<td>1.20</td>
</tr>
<tr>
<td>Participate effectively in discussions                                                  59</td>
<td>1.18</td>
</tr>
<tr>
<td>Apply the rules of correct spelling, punctuation, and capitalization                     59</td>
<td>1.15</td>
</tr>
<tr>
<td>Apply information to new or broader contexts                                            59</td>
<td>1.03</td>
</tr>
<tr>
<td>Write formal reports and business correspondence                                        59</td>
<td>.83</td>
</tr>
</tbody>
</table>

Note. Based on a 3-point rating scale with 1 = low and 3 = high.

Results indicate respondents felt the most competent about their ability to maintain harmony at work by modulating personal behaviors and actions. This is best demonstrated through the higher ratings received for skills such as “work without supervision” (M = 1.89, SD = .35), “work independently” (M = 1.81, SD = .39), “act responsibly and conscientiously” (M = 1.79, SD = .44), and “possess self-discipline, including punctual attendance and dependability” (M =1.76, SD = .46).

Respondents provided varying ratings for critical thinking-related skills. Students felt the most competent in their problem-solving abilities, as illustrated by the higher ratings for the items...
“identify, prioritize, and solve problems” ($M = 1.61$, $SD = .49$), “consider and evaluate alternative solutions” ($M = 1.47$, $SD = .56$), “contribute ideas and answers to solve problems” ($M = 1.45$, $SD = .33$), “determine the time, cost, or resources necessary for a task” ($M = 1.45$, $SD = .56$), and “make defensible/appropriate decisions” ($M = 1.45$, $SD = .56$). In contrast, ratings revealed that respondents felt less confident in their abilities to use extant knowledge to address new or unfamiliar situations and recognize possible outcomes. “Apply knowledge from formal educational experiences” ($M = 1.37$, $SD = .58$), “adapt to change” ($M = 1.23$, $SD = .62$), “recognize the political and ethical implications of decisions” ($M = .83$, $SD = .62$), and “apply information to new and broader contexts” ($M = 1.03$, $SD = .55$) were all ranked demonstrably lower.

Overall, respondents did not feel particularly competent in emotion-related skills. They did indicate higher levels of competence for the skills “demonstrate pride in accomplishment” ($M = 1.62$, $SD = .52$), “possess a positive attitude towards work” ($M = 1.62$, $SD = .52$), and “work well with others” ($M = 1.59$, $SD = .49$), but lower levels for those that involved understanding, evaluating, and motivating oneself as well as controlling one’s own emotions. Interestingly, respondents did not feel as competent in their abilities to “accurately monitor others’ emotional states” ($M = 1.23$, $SD = .77$).

Respondents indicated noticeably lower levels of competence regarding both written and oral communications skills such as “present information verbally to others” ($M = 1.20$, $SD = .60$), “participate effectively in discussions” ($M = 1.18$, $SD = .62$), “apply the rules of correct spelling, punctuation, and capitalization” ($M = 1.15$, $SD = .69$), and “write formal reports and business correspondence” ($M = .83$, $SD = .62$). However, they did feel more confident when communicating through mathematical concepts such as statistics, charts, and graphs.

**Objective 2**

Section II of the survey asked students to select and rank the top 10 behavioral skills they viewed as most integral to success. From this, two top 10 lists were created. Table 2 examined the top 10 skills by frequency, which actually amounted to 16 skills when ties between items were taken into account. Table 3 utilized student rankings to eliminate ties and develop an overall list of top 10 necessary career skills.
Table 2

Top 10 workforce-readiness skills identified by undergraduate students (N = 59)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Item (Question #)</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Work well with others (Q1)</td>
<td>39</td>
<td>66.0</td>
</tr>
<tr>
<td>2</td>
<td>Adapt to change (Q37)</td>
<td>30</td>
<td>50.8</td>
</tr>
<tr>
<td>3</td>
<td>Work independently (Q10)*</td>
<td>24</td>
<td>40.6</td>
</tr>
<tr>
<td>3</td>
<td>Teach and learn from others on the job (Q52)*</td>
<td>24</td>
<td>40.6</td>
</tr>
<tr>
<td>4</td>
<td>Manage several tasks at once (Q5)</td>
<td>23</td>
<td>38.9</td>
</tr>
<tr>
<td>5</td>
<td>Handle conflict maturely (Q28)*</td>
<td>21</td>
<td>35.5</td>
</tr>
<tr>
<td>5</td>
<td>Possess a positive attitude towards work (Q30)*</td>
<td>21</td>
<td>35.5</td>
</tr>
<tr>
<td>6</td>
<td>Demonstrate highly developed social skills (Q21)</td>
<td>19</td>
<td>32.2</td>
</tr>
<tr>
<td>7</td>
<td>Function effectively in stressful situations (Q8)</td>
<td>18</td>
<td>30.5</td>
</tr>
<tr>
<td>8</td>
<td>Possess self-discipline, including punctual attendance and dependability (Q31)*</td>
<td>16</td>
<td>27.1</td>
</tr>
<tr>
<td>8</td>
<td>Possess the ability to work without supervision (Q32)*</td>
<td>16</td>
<td>27.1</td>
</tr>
<tr>
<td>9</td>
<td>Show respect for the opinions, customs, and individual differences of others* (Q26)</td>
<td>13</td>
<td>22.0</td>
</tr>
<tr>
<td>9</td>
<td>Apply knowledge from formal educational experiences (Q4)*</td>
<td>13</td>
<td>22.0</td>
</tr>
<tr>
<td>10</td>
<td>Identify, prioritize, and solve problems (Q12)*</td>
<td>12</td>
<td>20.3</td>
</tr>
<tr>
<td>10</td>
<td>Receive and use both positive and negative feedback (Q47)*</td>
<td>12</td>
<td>20.3</td>
</tr>
<tr>
<td>10</td>
<td>Present information verbally to others (Q2)*</td>
<td>12</td>
<td>20.3</td>
</tr>
</tbody>
</table>

*Note. Items with the same frequency value are denoted with an *. 
Table 3

Top 10 workforce readiness skills identified by undergraduate students according to student rankings (N = 59)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Item (Question #)</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Work well with others (Q1)</td>
<td>39</td>
<td>66.0</td>
</tr>
<tr>
<td>2</td>
<td>Adapt to change (Q37)</td>
<td>30</td>
<td>50.8</td>
</tr>
<tr>
<td>3</td>
<td>Work independently (Q10)</td>
<td>24</td>
<td>40.6</td>
</tr>
<tr>
<td>4</td>
<td>Teach and learn from others on the job (Q52)</td>
<td>24</td>
<td>40.6</td>
</tr>
<tr>
<td>5</td>
<td>Manage several tasks at once (Q5)</td>
<td>23</td>
<td>38.9</td>
</tr>
<tr>
<td>6</td>
<td>Possess a positive attitude towards work (Q30)</td>
<td>21</td>
<td>35.5</td>
</tr>
<tr>
<td>7</td>
<td>Handle conflict maturely (Q28)</td>
<td>21</td>
<td>35.5</td>
</tr>
<tr>
<td>8</td>
<td>Demonstrate highly developed social skills (Q21)</td>
<td>19</td>
<td>32.2</td>
</tr>
<tr>
<td>9</td>
<td>Function effectively in stressful situations (Q8)</td>
<td>18</td>
<td>30.5</td>
</tr>
<tr>
<td>10</td>
<td>Possess self-discipline, including punctual attendance and dependability (Q31)</td>
<td>16</td>
<td>27.1</td>
</tr>
</tbody>
</table>

These lists indicate that respondents had a distinct preference for maintaining independence, dignity, and harmony at work despite challenges. “Work well with others” was the most commonly listed item across all top 10 lists, and it was also the item that received the most #1 rankings. Related items such as “teach and learn from others on the job,” “possess a positive attitude towards work,” and “demonstrate highly developed social skills,” demonstrate the value that respondents placed upon building positive relationships with their co-workers and customers.

The unranked list also includes “show respect for the opinions, customs, and individual differences of others,” a social skill that did not earn enough high rankings to find a place in the final top 10. The high rankings given to “adapt to change,” “manage several tasks at once,” “handle conflict maturely,” and “function effectively in stressful situations,” shows that respondents recognize the necessity of continuing to grow both personally and professionally in the face of obstacles.

Objective 3

Openings being advertised included 8 positions in agriculture education and extension (16%); 7 in veterinary or animal science (14%); and six each in livestock management (12%); agricultural sales, business, and economics (12%); and horticulture, plant science, and natural resources (12%). Five positions were in the field of agricultural communications (10%), 4 were in mechanics, 3 each were in transportation (6%) and food science (6%), and 2 positions were in government or agricultural policy and law (4%). Sample jobs selected included veterinary assistant, cattle ranch manager, florist, biotechnologist, welder, salesperson, FFA camp manager, aquaculturist, social media director, engine mechanic, Congressional lobbyist, and agriculture economist.

Communication skills were the most in demand, with verbal skills being referenced on 33 job opening announcements (66%) and written skills on 21 (42%). One posting specifically sought employees that possessed “effective communication skills, both oral and written,” that could
“handle controversial issues with tact and a professional manner.” Others stressed “excellent communications and math skills,” “the ability to read and follow written and oral instructions,” “the ability to read and write very well,” and being able to “communicate with co-workers and the public.” Skills such as teamwork, cooperation, and attitude were also highly sought after, being listed on 23 (46%) of announcements. In this case, employers wanted people who were “friendly and outgoing,” “thoughtful and passionate about [their] work,” and able to “work cooperatively with others and follow directions.” Other important skills identified in job postings included time management and organization (n = 15, 30%), flexibility and adaptability (n = 11, 22%), working independently and/or without supervision (n = 10, 20%), meeting customer needs (n = 9, 18%), problem and conflict management (n = 8, 16%), learning on the job (n = 4, 8%), and personal integrity and responsibility (n = 4, 8%). Job postings sought candidates who could “organize large amounts of information,” demonstrate “creativity and flexibility,” “work independently as well as be a team player,” “learn, implement, and teach new protocols,” and be “punctual for every shift, courteous to every guest, and diligent in their duties.”

**Objective 4**

Finally, participants were asked to list ways in which college students like themselves might be able to learn or develop each of their top 10 skills. Many indicated that the regular events of college life could be easily used as a training ground for workforce readiness skills. Table 4 shows some of the most common responses received for each item on the final, ranked top 10 list.

<table>
<thead>
<tr>
<th>Workforce Readiness Skill</th>
<th>Student Suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Work well with others</td>
<td>Group projects</td>
</tr>
<tr>
<td></td>
<td>Clubs/student organizations</td>
</tr>
<tr>
<td></td>
<td>Social events</td>
</tr>
<tr>
<td></td>
<td>Intramural sports</td>
</tr>
<tr>
<td>2. Adapt to change</td>
<td>Change in the classroom (due dates, new projects, different teaching styles etc.)</td>
</tr>
<tr>
<td></td>
<td>Working with new technology</td>
</tr>
<tr>
<td></td>
<td>Trying new things/gaining new experiences</td>
</tr>
<tr>
<td></td>
<td>Learning on the job</td>
</tr>
<tr>
<td>3. Work independently</td>
<td>Individual class assignments</td>
</tr>
<tr>
<td></td>
<td>Homework</td>
</tr>
<tr>
<td></td>
<td>Tests</td>
</tr>
<tr>
<td>4. Teach and learn from others on the job</td>
<td>Mentor others/receive mentoring</td>
</tr>
<tr>
<td></td>
<td>Allow students to teach</td>
</tr>
<tr>
<td></td>
<td>Group projects</td>
</tr>
<tr>
<td></td>
<td>Tutor others/receive tutoring</td>
</tr>
<tr>
<td></td>
<td>Work part-time while in school</td>
</tr>
</tbody>
</table>
Table 4 (continued)

\textit{Student Suggestions for Development of Workforce Readiness Skills}

<table>
<thead>
<tr>
<th>Workforce Readiness Skill</th>
<th>Student Suggestions</th>
</tr>
</thead>
</table>
| 5. Manage several tasks at once | Take several classes in one semester  
Managing due dates  
Work part time while in school |
| 6. Possess a positive attitude towards work | Positive classroom atmospheres  
Offer incentives for students to work hard  
Group projects  
Keeping a positive attitude in life |
| 7. Handle conflict maturely | Conflict during group projects  
Debate and discussion activities  
Problem-solving activities/workshops  
Disagreements with professors or classmates |
| 8. Demonstrate highly developed social skills | Structured social events  
Activities requiring communication and collaboration  
Public speaking activities  
School promotion activities (tour guide, etc.) |
| 9. Function effectively in stressful situations | Class deadlines and due dates  
Timed tests/assignments  
Managing school, work, and life  
Exposure to new or uncomfortable situations |
| 10. Possess self-discipline, including punctual attendance and reliability | Required attendance to class  
Rewarding students for continued punctuality/attendance  
Managing school, work, and life |

\textbf{Conclusions}

Results were mostly concurrent with previous studies exploring student and employer perceptions of workforce readiness skills. The importance of key traits such as the ability to solve problems and work independently, function on a team, communicate with others, think critically, and relate with clients and co-workers have been stressed numerous times across varying career fields (Billing, 2003; Landrum & Harrold, 2003; Landrum et al., 2010; Robinson & Garton, 2008; Schmidt, 1999). This indicates that participants had at least some understanding of the competencies that are required in the modern workplace.

It is interesting to note the differing levels of importance that employers and respondents placed upon communication skills. These skills were the most frequently requested by employers and appeared in well over half of the analyzed job announcements, but they were viewed as less important by respondents. “Demonstrate highly developed social skills,” “receive and use both
positive and negative feedback,” and “present information verbally to others” all made the first, unranked top 10 list, but they placed relatively low, with the first being #6 and the latter two tying for #10. Of these skills, only “demonstrate highly developed social skills” made the final, ranked top 10 list, receiving the #8 place.

Verbal communications skills also provided the greatest example of a disparity between participant perceptions of skill importance and competence. Even though participants believed that the communication-related items “demonstrate highly developed social skills,” “receive and use both positive and negative feedback,” and “present information verbally to others,” were some of the most important workforce readiness skills to possess in Section II of the questionnaire, these same items all received consistently lower competence ratings in Section I. In other words, survey participants saw value in speaking effectively to others, but they saw themselves as unable to do it well.

No written communication skills made either top 10 list, which indicates that universities may not be doing enough to stress the value of functional, work-related communication such as formal reports, letters, emails, and memos. Written communication items also received extremely low competence ratings overall, with the ability to “write formal reports and business correspondence” receiving the lowest competence ranking of all.

When considering competency areas other than communications, students and employers were able to find more common ground. Just under half of the job announcements used in this study sought applicants who could demonstrate such behaviors as friendliness, cooperation, passion, and teamwork while on the job. Not only did students report high levels of competence regarding these attributes, they also included them frequently on their top 10 lists of most important workforce readiness skills.

Employers also sought applicants who were organized, flexible, independent, and capable of learning on the job. Students rated themselves as particularly able to work independently and/or without supervision, and ranked it quite highly in importance as well. Students also indicated they felt highly competent in their ability to teach and learn from others in the workplace, a construct that was also ranked highly on many top 10 lists. Finally, while students reported slightly lower competence levels in the areas of organization, flexibility, and response to stressful or changing situations, they still recognized the value of such skills by including them as some of the most important. Indeed, the final top 10 list generated from all responses is largely made up of these core competencies, which indicates that on many counts both students and employers recognize the same attributes as being vital to workplace success.

Recommendations

It is recommended that agriculture educators of all levels assess their students’ perceptions of career readiness in some manner. This information can help educators better design their agricultural education programs and courses with career-based outcomes in mind. It can also assist educators in recognizing what skills students possess or lack, and ways in which weaker skills might be strengthened. Participants in the study frequently mentioned group work, presentations, in-class debates, and public speaking as common methods through which behavioral skills are practiced. However, educators can expand upon these ideas by creating lessons and activities that require students to think in an industry-based setting. For example, if writing is a weakness (as it was in this study), a teacher might identify examples of writing or correspondence that are actually used in a particular agricultural industry and have students practice constructing and editing such documents. Educators should also create lessons that require students to think critically while
gathering evidence, constructing arguments, making decisions, and solving problems in an industry-specific context. A possible activity might include asking students to perform their own research about industry needs and writing recommendations for students like themselves. Of course, classroom activities need not be limited to behavioral skills; rather they should be expanded to include specific capital skills that are tailored to students’ career goals and local industries’ needs if possible.

Educators and students are also recommended to develop positive relationships with local industry employees and employers. Educators can use personal relationships to gain insight into current industry trends and demands, and provide students with firsthand accounts of working life via guest lectures, field trips, or interviews. Students who build relationships with industry personnel can benefit from the internships, job openings, recommendations, and other learning opportunities that are offered to those with industry connections.

It is also recommended that agricultural educators help their students to recognize ways in which behavioral skills can be developed or exercised in everyday life. Study participants recommended joining clubs or sports teams, building relationships with classmates, and mentoring or tutoring others as ways to accomplish these goals. Participating in community-engaged learning activities, club competitions, and Supervised Agricultural Experience (SAE) programs are also other possibilities, as is taking on a leadership role in any of these opportunities.

Further research in this area is also recommended so that more specific career needs can be identified. American agriculture is a very broad industry, and it is possible that certain sectors may require or prefer some workforce readiness skills above others. Further research could also be performed to discover the workforce readiness competencies of students in other areas of the United States. This study investigated students from a Southern state, and Robinson and Garton (2008) examined students from the Midwest/South. It is possible that students (or employers) from different areas of the country may view or value the examined competencies in a different manner. Finally, it is recommended that this study be repeated with a larger sample of students from agricultural degree programs.

References


Information Needs and Information-seeking Behaviors of Urban Food Producers: Implications for Urban Extension Programs

Kumudu P. P. Kopiyawattage1, Laura A. Warner,2 & T. Grady Roberts3

Abstract

Extension is challenged with meeting the needs of a variety of stakeholders. As the country becomes more urban, Extension may need to adapt programming to reach new clients. Having an understanding about what, when, and how urban food producers gather information is important to address their needs. Information that is relevant, up-to-date, and meets clients’ needs, enables their ability to adopt new ideas and innovative technologies, providing more opportunities for success. A mixed-method research design explored the information needs and information-seeking behavior of urban food producers in Columbus, Ohio. Urban food producers in this study most needed information to increase food production. Respondents preferred to receive information from the Internet and other electronic media over conventional information sources. This group of urban producers trusted information from university and Extension sources, but expressed mixed opinions about their personal experiences with OSU Extension.

Keywords: agricultural information, information-seeking behavior, urban Extension, food production

Introduction

The Urban Agriculture Committee of the Community Food Security Coalition (2002), defined urban food production as “the growing, processing, and distribution of food and other products through intensive plant cultivation and animal husbandry in and around cities” (p. 4). Urban food production has been identified as an important component of urban sustainability (Alberti, Marzluff, Shulenberger, Bradley, Ryan, & Zumbrunnen, 2003; van Veenhuizen & Danso, 2007). The demand and recognition for urban food production is increasing globally as a sustainable development strategy in cities (van Veenhuizen, 2006). When food is produced within a city, the cost of transportation, processing, and packaging is less, compared to food produced outside of a city (Mendes, 2006; Mougeot, 2006). Building community and social capital, self-sufficiency, and creating local resilience are other advantages of urban food production (Brown & Jameton, 2000).

Not only nationally, but also internationally, efforts have been taken to improve food production in urban areas as a sustainable urban development strategy (van Veenhuizen, 2006). Greening urban cities, utilizing organic waste, reducing pollution, minimizing heat, and improving air quality are some of the advantages of urban food production. It also helps to building community and social capital, which in turn creates self-sufficiency and social resilience (Brown & Jameton, 2000).

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3 T. Grady Roberts is a Professor at the University of Florida, PO Box 112060, Gainesville, FL 32611-2060, groberts@ufl.edu
For these reasons, the attention for urban vegetation and urban gardening has increased, as they contribute to improve the quality of urban life by offering opportunities for mental relaxation, social integration, and physical exercise (Lee & Maheshwaran, 2011).

This study addresses Research Priority Area 5 from the AAEE National Research Agenda, Efficient and Effective Agricultural Education Programs (Roberts, Harder, and Brashears, 2016). More specifically, it sought to answer question 6, “What methods, models, and programs are effective in communicating with diverse audiences?” (Roberts et al., 2016, p. 10).

Theoretical Framework

Information-seeking behavior is the “gap bridging process, where individuals make moves, influenced by information in time and space to reach desired outcomes” (Sturges & Chimseu, 1996, p. 136). In the Theory of Planned Behavior (TPB), Ajzen and Fishbein (1980) identified attitude, subjective norm, and perceived behavioral control as determinants of behavioral intention. As explored by Taylor and Todd (1995) in their Decomposed Theory of Planned Behavior (DTPB), an individual’s belief towards their ability to perform a behavior (perceived behavioral control) is influenced by the availability of information about that behavior. When an individual is confident about the availability of resources towards performing the behavior he/she is strongly influenced to perform that behavior (Ajzen, 1991). Operationalized in the current study, when urban producers perceive that they possess information (availability of information; Taylor & Todd, 1995) that decreases the difficulty of producing food, they are more likely to engage in that behavior (Ajzen, 1991). If the urban producers believe there would be elements that prevent the availability of information, then they are less likely to perform the behavior.

Limited research has examined information needs of this unique sub-set of agricultural producers. Information needs of urban producers are context specific and depend on several factors (Byamugisha, Ikoja-Odongo, & Nasinyama, 2010). Those factors include value urban farmers attach to different information sources, characteristics of farmers such as level of education, income, gender, and homogeneity or heterogeneity of the farm (Byamugisha, et al., 2010). Urban producers use various sources of information. Identifying these different sources of information used is important for information dissemination (Duram & Larson, 2001). The Internet, government information sources, university sources, Extension agents, non-profit organizations, and exhibitions are some of the information sources used by urban food producers (Angello, Msuya, & Matovelo, 2016; Harms, Presley, Hettiarachchi, & Thien, 2013). Out of those sources, online sources are mostly preferred by urban producers compared to other sources (Surls, Feenstra, Golden, Galt, Hardesty, Napawan, & Wilen, 2014). Therefore, promoting collaborations among different information sources, using more online sources to supplement existing information dissemination approaches, and providing information in different languages is important in urban areas (Angello et al., 2016; Harms et al., 2013; Surls et al., 2014).

Previous research has also examined the communication preferences of other Extension audiences. Warner, Stubbs, Murphrey, and Huynh (2016) conducted a national Delphi study to determine the competencies needed by Extension personnel to use social marketing. They identified eight competency areas: “(a) Personal attributes; (b) Knowledge and understanding; (c) Research and analysis; (d) Communication; (e) Leadership; (f) Professionalism and ethics; (g) Program-planning, implementation, and evaluation; and (h) System thinking” (p. 14). Within these eight categories areas were competencies like “build collaborative relationships based on trust and authenticity” (p. 24), “identify and locate stakeholders” (p. 25), and “synthesize primary and secondary data to understand target audience’s perceived barriers, benefits, and motivators to a given change” (p. 24). In a study of agricultural opinion leaders, Lamm, Rumble, Carter, and Lamm
(2016) found this audience preferred receiving information from web pages and meetings. Twitter, conference calls, and other sources were less preferred. Social media has also been examined within the context of Extension. Bowen, Stephens, Childers, Avery, and Stripling (2013) found social media usage was prevalent in both rural and urban 4-H programs. Rumble, Lamm, Martin, and Warner (2017) examined how to frame messages with homeowners to increase water conservation behaviors. They discovered this audience responded to the social implications of the message.

Having an understanding about what, when, and how urban producers gather information is important for Extension to be able to address their needs. When urban producers receive information that is relevant, up-to-date and meets their needs, they have greater ability to adopt new ideas and innovative technologies, providing more opportunities for success (Mchombu & Cadbury, 2006). By understanding the information needs and information-seeking behavior of urban agriculture producers, we can map how urban producers’ knowledge is constructed and how they are influenced by different sources of information.

**Purpose and Objectives**

The purpose of this study was to describe how the information needs and information-seeking behavior of urban food producers influence their perceived behavioral control towards urban farming. The specific objectives that guided the study were to:

1. Identify the most needed information of urban food producers.
2. Identify the frequency of usage and trust in information sources.
3. Explore participants’ satisfaction with the OSU Extension.

**Methods**

This study used a mixed method research approach to develop a more detailed description of a phenomenon of individuals involved in it. The methodology of the study included a semi-structured interview and a questionnaire. This research was conducted as a part of a larger research study.

**Instrumentation**

A questionnaire was developed to collect quantitative data. A hybrid of several instruments that measured information-seeking behavior, trust, and satisfaction were used, based on the work of Mugwisi, Ocholla, and Mostert (2014), who developed a questionnaire on information needs of agricultural researchers and Extension workers in Zimbabwe. The UF/IFAS Extension Customer Satisfaction Survey (Israel, 1997) was used to capture the interaction and satisfaction with the CES. The first section of the questionnaire required respondents to indicate the type of information they needed to improve their production and to be successful urban producers. In the second section the respondents were given 20 sources of information and were asked to indicate the frequency of use (1 = never use, 2 = less than once a month, 3 = about 1-2 times a month, 4 = once a week, 5 = several times/week). In the same section, respondents were asked to rank the level of trust they associate with the quality of each information source on a scale of five (1 = very poorly trust, 2 = poorly trust, 3 = moderately trust, 4 = highly trust, 5 = very highly trust).

Individual interviews with commercial urban producers were conducted to collect qualitative data. A researcher-developed interview guide was designed based on the conceptual framework used for the study. The interview guide development process included several important steps such as literature review, feedback from a panel of experts, and approval from the institutional
review board of the University of Florida. The questionnaire included open-ended questions about the information needs and information-seeking behavior of urban food producers. According to the developed qualitative interview guide, first, the respondents were asked about their most needed information to continue urban food production. Then the respondents were asked about their perception towards different information sources they receive information from. Finally, the respondents were asked their opinion about the services offered by OSU Extension.

To ascertain that the developed instruments measured the intended constructs, steps were taken to overcome threats to validity, reliability, and sources of error. To overcome threats to internal validity, items adapted from established instruments were kept unchanged and data were collected within a limited period. Threats to statistical validity which is caused due to errors in statistical interpretations and wrong data analysis (Ary, Jacobs, Sorensen, & Walker, 2014) were overcome by getting feedback from a panel of experts who had expertise in urban Extension, agricultural education and communication, and survey design and research. By using established instruments, threats to construct validity were addressed. A pilot test was conducted before the actual data collection to establish reliability. Needed changes were done to the instrument based on the results of the pilot study.

Establishing trustworthiness is important in qualitative studies. Lincoln and Guba (1985) used the term trustworthiness to talk about the validity of qualitative research. Triangulation and member checking were used to establish credibility. Multiple data sources such as researcher notes and audio transcriptions were used to establish credibility of the collected data. After the data were transcribed, they were sent to the respondents to review for accuracy. According to the feedback from the respondents, needed changes were done to the transcriptions to ensure the accuracy of the transcribed data. Transferability was established through thick description and confirmability was established through an audit trail. Transferability measures as it relates to thick description, the participants of this study were chosen based on having urban farming experiences in Columbus. Throughout this study the researcher maintained a journal to take notes of each visit to individual producers. Audio records of each interview were listened multiple times for understanding. Transcriptions of the interviews were checked with the audio to ensure accuracy. All the reflective processes, notes, and data analysis used in this study were documented.

Population and Sample

The target population for this study was commercial urban food producers in the city of Columbus, which was purposively selected for this study because it is recognized as a national leader in urban Extension and has branded Extension in the city as OSU Extension (National Urban Extension Leaders, n.d). OSU Extension has a presence in each county, linking communities to teaching, researching, and outreach resources of the university. The sample was identified using the urban Extension specialist (a key informant) with extensive experience in urban agriculture in the city (Ary et al., 2014). Fifteen commercial urban producers were initially identified and snowball sampling was used to identify additional commercial producers. Of the original nominated producers, eight agreed to participate. These eight nominated an additional seven producers. In total, 15 commercial urban food producers participated in the study. Producers were given a code based on the order in which their data was collected (R1, R2, R3, etc.).

Out of those 15, 10 producers were female and 5 producers were male. Respondents have lived in urban areas an average of 15 years. Most respondents (54%) indicated the highest level of education completed was a 4-year college degree followed by 15%, 16%, and 15% of respondents who had completed some college education, a graduate or professional degree, and high school or GED respectively. About 70% of respondents stated that their gross annual income was below
$10,000. Fifteen percent of respondents stated their income was between $10,000 to $19,000. The income category between $20,000-$39,000 and $40,000 - $59,000 was 8% each. Respondents’ average years of experience as urban farmers was 6 years.

Data Collection and Analysis

Data collection was conducted in January of 2017. The lead researcher visited each respondent personally to collect data. Interviews were conducted on the farm premises of the respondents. The purpose of the research was explained and informed consent was obtained. Casual conversations were made with respondents to build rapport as suggested by Creswell (2013). The researcher spent an average of 2-3 hours with each respondent interviewing, observing, touring their farms, and shadowing the respondents’ farm operations. Each respondent took approximately 20-30 minutes to complete the questionnaire. Interviews lasted an average of ten minutes with each respondent beyond the questionnaire. All the interviews were voice recorded with the permission of the respondents. Researcher notes were also taken.

The conceptual framework developed by the researcher was used as the guide for data analysis. The constructs developed in the conceptual model were considered as the base for thematic areas identified through data analysis. The data were transcribed first by the researcher. In order to understand the data deeply, transcriptions were read several times (Ary et al., 2014). To identify categories, line-by-line open coding was used as suggested by Strauss and Corbin (1990). After the initial analysis, those identified categories and respondents’ quotes related to each category were recorded on a spreadsheet. Descriptive statistics were used to summarize quantitative data.

Results

Preferred Information

The most needed information for urban farming selected by respondents were related to increasing production (R3, R4, R7, R8, R9, R11, R13, R15). Respondents also needed information about pest and disease control (R2, R4, R9, R15), information on available resources (R7, R8, R11), marketing and business management (R5, R3, R12, R10), and grant and other funding opportunities (R1, R3, R5, R7).

Frequency of Use of Information Sources

The respondents use a variety of information sources (see Table 1). Out of the thirteen sources of information given, the Internet is the most frequently used source of information by respondents followed by friends and co-workers, and family and close relatives. Events at research centers, newspapers, commercial trade shows, neighbors, and local garden stores were the least frequently used sources of information.
Table 1

Frequency of Use of Information Sources

<table>
<thead>
<tr>
<th>Information Sources</th>
<th>Never Use</th>
<th>Use 1-2 times per year</th>
<th>Use 3-4 times per year</th>
<th>Use about monthly</th>
<th>Use about weekly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>20</td>
<td>72</td>
</tr>
<tr>
<td>Friends or co-workers</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Family members or close relatives</td>
<td>27</td>
<td>13</td>
<td>13</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>University web sites</td>
<td>7</td>
<td>20</td>
<td>20</td>
<td>27</td>
<td>20</td>
</tr>
<tr>
<td>Company web sites</td>
<td>14</td>
<td>27</td>
<td>7</td>
<td>34</td>
<td>14</td>
</tr>
<tr>
<td>Food production magazines</td>
<td>14</td>
<td>34</td>
<td>34</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Television programs</td>
<td>60</td>
<td>14</td>
<td>7</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Neighbors</td>
<td>20</td>
<td>20</td>
<td>47</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Local garden store</td>
<td>27</td>
<td>27</td>
<td>20</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Articles in the local newspaper</td>
<td>47</td>
<td>20</td>
<td>20</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Consultations with university specialists</td>
<td>14</td>
<td>27</td>
<td>40</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Commercial Trade Shows</td>
<td>34</td>
<td>47</td>
<td>14</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Events at Research Centers</td>
<td>40</td>
<td>47</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Internet.** Time to access, availability, and cost of access has made the Internet the most convenient source of information for respondents (R1, R3, R5, R6, R8, R9, R11, R12, R13, R15). The Internet is a very powerful method based on the fact that the respondents are able to gain access to this source in the convenience of their home, instead of going elsewhere. As stated by R12, the Internet is the “cheapest and most effective source of information. So why not use it?”

Respondents used social media applications on the Internet to share information and to communicate with other producers. Facebook was the mostly used Internet application by the respondents. Almost all the respondents were members of different Facebook groups which are relevant to urban farming. These Facebook groups related to farming have members from around the world. Members of these farming-related social media groups represented a wide variety of agricultural professionals such as researchers, food producers, Extension officers, authors etc. Therefore, Facebook has become a very trustworthy, convenient, and inexpensive way to share, learn, research, disseminate and to consult for information. Most of the respondents were accustomed to posting on Facebook groups before reaching out to other sources, whenever they have a problem that needed to be solved on the farm. R3 stated that the Facebook groups gave her the opportunity to “communicate with other urban producers who are steps above her in scale and in the market.” For R12, the biggest advantage of using Facebook groups was the opportunity it
provided to interact with ‘the people’ in the urban agriculture sector who have contributed a lot in terms of research and publications.

Thankfully, there's groups on Facebook that I'm in where it's –in my opinion the best farmers in the whole country if not the whole world. It's all these people that wrote these books in there and they'll talk to you like you're a normal person. They're just awesome humble people. (R12)

Other than Facebook, some respondents also used YouTube (R15, R 10, R3, R 6), online blogs maintained by other urban producers (R1, R3, R6, R7), and online publications by different institutions (R4, R10).

Friends and co-workers. Urban producers were their own sources of information. Almost all the producers interviewed for this study stated that they consult their friends and co-workers for information. R1 stated that her first source of information was her friends who she meets in the farmers’ market. Whenever she has a problem she is used to reaching out to those friends because “they have a little bit more experience dealing with problems, they got a little more crop variety and a little more land. And they’ve been in production for a longer.” According to R3, she felt very comfortable talking to her friends whenever she had a problem that needed to be solved on the farm.

**Trustworthiness of Information Sources**

Table 2 presents the findings of the trustworthiness of different sources of information. Most respondents trusted university resources over other resources because the university experts were more knowledgeable and have research backgrounds. Respondents used resources from different universities.

Other resources that I found recently that I really like as well is that Michigan State Extension office has a handful of programs that really do a good job focusing on the small-scale farmers in particular. (R5)

Other than that, respondents also stated that they trust on-farm tours and demonstrations (R5, R7, R8, R10) because they get to see and feel the actual situation in those farms. Some respondents mentioned that they do not have time for farm visits, even though they prefer to go (R12, R 3, R1).
Table 2

Trustworthiness of Information Sources

<table>
<thead>
<tr>
<th>Information Source</th>
<th>Very poorly trust %</th>
<th>Poorly trust %</th>
<th>Moderately trust %</th>
<th>Highly trust %</th>
<th>Very highly trust %</th>
</tr>
</thead>
<tbody>
<tr>
<td>University web sites</td>
<td>0</td>
<td>7</td>
<td>34</td>
<td>14</td>
<td>40</td>
</tr>
<tr>
<td>Consultations with university specialists</td>
<td>0</td>
<td>0</td>
<td>47</td>
<td>7</td>
<td>40</td>
</tr>
<tr>
<td>Demonstration gardens</td>
<td>7</td>
<td>0</td>
<td>20</td>
<td>27</td>
<td>40</td>
</tr>
<tr>
<td>Friends or co-workers</td>
<td>0</td>
<td>0</td>
<td>78</td>
<td>47</td>
<td>34</td>
</tr>
<tr>
<td>Local garden store</td>
<td>7</td>
<td>7</td>
<td>40</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Events at Research Centers</td>
<td>7</td>
<td>0</td>
<td>34</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Family members or close relatives</td>
<td>14</td>
<td>0</td>
<td>34</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>Commercial Trade Shows</td>
<td>0</td>
<td>20</td>
<td>27</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Company web sites</td>
<td>7</td>
<td>0</td>
<td>27</td>
<td>47</td>
<td>14</td>
</tr>
<tr>
<td>Food production magazines</td>
<td>7</td>
<td>14</td>
<td>34</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>Internet</td>
<td>0</td>
<td>0</td>
<td>47</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>Neighbors</td>
<td>7</td>
<td>67</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Television programs</td>
<td>14</td>
<td>14</td>
<td>40</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Articles in the local newspaper</td>
<td>14</td>
<td>0</td>
<td>54</td>
<td>20</td>
<td>0</td>
</tr>
</tbody>
</table>

Cooperative Extension Service

**Interaction.** When the respondents were asked about their interaction with the CES, about 74% of the respondents stated that they have used CES and about 14% of the respondents stated that they have never used CES. Respondents who have never used Extension were asked about reasons they did not use Extension and they stated that they were unaware of its existence in the city. About 7% of the respondents use CES monthly or weekly while about 40% and 27% of the respondents use CES 1-2 times per year and 3-4 times per year respectively.

**Satisfaction.** Only 13% of the respondents indicated they were highly satisfied with the overall services offered by the CES. About 27% of the respondents were satisfied with the overall services offered by the CES. About 7% of the respondents were highly dissatisfied with the overall services offered by the CES. About 20%, and 14% of the respondents were dissatisfied, and neither satisfied nor dissatisfied about the overall services by the CES respectively.

As mentioned in the previously, Extension is not the most preferred source of information by the respondents however, they trust Extension resources, because the information is coming
from university research and university professionals. Their satisfaction about overall Extension service depends on several factors such as mode of delivery, time to access, and availability of information. Some respondents mentioned that the Extension services are useful for basic information only. (R15, R4).

**Perceptions.** OSU Extension has initiated an urban producer networking group which facilitates social gatherings for urban producers, to meet up and network with others. The respondents appreciated this because it gives them an opportunity to network with other producers in the city.

Another thing is urban farmers’ network. Out of this Extension business, he and other people get together and started get together that we could meet each other and socialize. It is wonderful. We had our first meeting a couple of weeks ago and it was a wonderful time. There were about 20 producers. It was fun and exciting. So, it is not just learning through Extension but also the social outlet. (R2)

Some respondents (R1, R3, R5, R6) also have had some negative experiences with Extension personnel which had made them reluctant to reach out to Extension in the future. R1 expressed that he could not receive the information he needed and Extension did not help him to reach out to other people who would had information for him. Moreover, R3 mentioned her disappointment towards a specific Extension agent for not disseminating new information he got from conferences and other related events he attended. Responsiveness of Extension towards respondents’ issues and information needs were also criticized by several respondents (R1, R3, R5, R6). R3 stated, that she received “vague responses to specific questions” she has asked from Extension.

I have needed quick information before and I have reached out to my Extension agent. And I have been told by him that he had no information for me. And even if I follow up they say they don’t have information. That is not the only example that the same thing had happened. (R1)

Another respondent said,

I have definitely gotten a few vague responses from him to specific questions I have asked. I've had other people who've gotten just like “no I can't help you” and I just feel like there should be more responsiveness to the fact that people are - you're saying you want to be here for us so how do we work together to do that. (R3)

During the interviews, several respondents complained that most of the Extension materials they receive are irrelevant to agriculture. (R1, R5, R12, R7).

I would say the e-newsletter I get which is the main thing that comes from Extension that I've seen from our office. It is actually pretty off putting because it does not include anything about agriculture. (R1)

Respondents also stated their preference towards the information delivery modes used by Extension. Webinars are not preferred by respondents because they are difficult to get through and easy to avoid (R1, R5, R10). R5 said that the fixed slides used in webinars have not been very “attention getting and attention keeping” for her. Respondents preferred to receive information through e-mails (R2, R3, R4, R8, R9, R11, R14, R15), other electronic media such as Facebook
posts (R1, R12, R5, R9), and searchable databases (R11, R13). R13 said that he preferred online materials more because he does not have to “drive half an hour to go sit somewhere to receive information.” R4 stated that he preferred “searchable interfaces” so that he could “learn what they need rather than being overwhelmed with too much information.”

Respondents also expressed their opinion on in-person training organized by OSU Extension. The respondents preferred to receive Extension information as on-farm demonstrations and in-person training because it is the best way to have a captive audience and to learn from a more experienced group through interactive activities.

Conclusions, Recommendations, and Implications

Urban food producers in this study most needed information to increase food production. Respondents preferred to receive information from the Internet and other electronic media over conventional information sources. This group of urban producers trusted information from university and Extension sources, but expressed mixed opinions about their personal experiences with OSU Extension.

Urban farming is a very information-intensive activity. As stated by the respondents themselves, most of them were first-generation urban farmers. Therefore, they do not have parental sources who can pass down basic knowledge about agriculture, which makes them highly dependent on other information sources. The respondents use a variety of information sources to gain agriculture-related knowledge. Those information sources are selected mainly by choice. Diekmann, Bennaton, Schweiger, and Smith (2017) in a study conducted with urban producers in California reported similar findings, which highlighted the need for reliable online information sources for urban farmers. Respondents also prefer and trust close ties such as friends and co-workers from which to receive information. According to Granovetter (1973), new information flows more through weak ties than through strong ties because connections in the close network circle of an individual tend to move similar to that individual. Therefore, weak ties play an important role in allowing an individual to access new information. But, the findings of this study contradict with Diekmann and Batte (2009), who concluded that San Francisco farmers prefer print and other traditional information sources over interpersonal and electronic media. But the authors had not considered rural-urban differences in their study. If the researchers had considered rural and urban farmers separately, the findings would have been more powerful in interpreting the preference of producers. The same study stated that those who prefer the Internet and other online sources tend to be educated and younger than other producers. This aligns with the findings of this study because most of the respondents were highly educated and were young in age. Llewellyn (2007) stated that information needs to be relevant, meaningful, and delivered in a way that is desired by producers.

These results highlight a need for change in Extension program delivery modes in urban areas. Extension needs to focus more on electronic and other visual media to disseminate information to urban producers. As suggested by Mastel (2014), adopting new technologies will help Extension to expand its audience. Extension is best suited to help beginning farmers because more advanced farmers who need specialized assistance are better able to pay for consultants. But, if OSU Extension is planning to address the needs of all farmers, the respondents’ perception of the fact that Extension is useful only for basic information could be overcome by designing and delivering programs to segmented audiences such as beginning farmers, established farmers, commercial farmers, community gardeners etc.
Visibility of Extension is a matter of concern in urban areas. Since Extension originated in the rural areas, targeting rural population, some urban respondents are still not aware of the services they can get from Extension, while some of them are completely unaware of the existence of Extension. Several research studies have stated that awareness, participation, and use of Extension resources is low among urban populations. (Jacob, Willtis, & Crider, 1991).

The respondents’ trust towards Extension and university resources is high, but they are concerned about the time, mode of delivery, and availability of Extension information. Some respondents believe that Extension is useful only up to a certain point and thereafter Extension cannot help with farming. Some respondents who are aware of Extension programs believe they could not benefit from Extension programs. This poses a challenge for Extension. It is recommended to conduct awareness programs among urban producers about the services available through Extension. Farmers’ markets could be a great avenue to spread the word about Extension, for those producers who are unaware of its existence. Since the respondents highly depend on co-workers and friends, producers who attend Extension programs could be advised to make other producers aware of Extension programs and resources available through Extension. Key leaders within the urban farming communities could be used to serve as opinion leaders to develop trust and to inform other producers of Extension services.

Other than quality, mode of delivery, relevance, and other factors that are related to information sources, it was also realized that personal characteristics of the information disseminator also plays an important role. Several producers interviewed for this study have had negative experiences with Extension professionals. Those unpleasant experiences had made them dislike and become demotivated towards seeking out help from Extension. Raison (2010) and Reynolds (2011) suggested that the Extension agents taking on the traditional role of being an educator need to be combined with the role of a facilitator to effectively serve urban communities. Lelekacs, Bloom, Jayaratne, Leach, Wymore, and Mitchell. (2016) added more to it by suggesting “to provide educators with knowledge about food systems research, as well as tools, and guidance about working across disciplinary lines, facilitating community engagement, and addressing social dimensions of local food systems” (p. 2).

Today, available information and information sources are very diverse. Therefore, the need for quality information that is delivered on time, in the proper format is important to meet the needs of urban producers. Extension professionals are required to have a better understanding urban producers’ information-seeking behavior. Future research on digital and online information delivery strategies and expected competencies from urban Extension professionals will assist Extension to design and deliver effective Extension programs to the urban clientele they serve. Additionally, this study should be replicated in other urban centers around the country to see if similar findings emerge.

References


Early Field Experience Course Students’ Perceptions of School-based Agricultural Education Laboratory Environments

Trent Wells¹, Scott W. Smalley,² & Bryan D. Rank³

Abstract

Laboratory instruction is an important component of school-based agricultural education (SBAE) programs (Phipps, Osborne, Dyer, & Ball, 2008). Early field experience (EFE) coursework can be an important component of agricultural teacher preparation programs (Retallick & Miller, 2007). Through the use of a modified photovoice technique, we sought to identify the perceptions of students (i.e., preservice teachers) enrolled in an EFE course in relation to the laboratory environment component of the SBAE model. Students enrolled in a 40-hour EFE course photographed a laboratory environment at their placement site and completed a 250-word descriptive/reflective summary of the laboratory. Through open coding of the summaries, three prominent themes emerged: 1) project-based learning is widely used for instructional purposes; 2) laboratory environments are set up and arranged in particular fashions based on needs; and 3) laboratory environments are arranged as settings for effective learning. Within the photographs, the agricultural mechanics laboratory was most commonly identified as a laboratory environment. The EFE students identified laboratory environments are not always traditional in their scope, and classrooms can serve as laboratory environments. We recommend photovoice be further used as a tool to explore students’ perceptions of the realities of modern SBAE programs.

Keywords: Early field experience; EFE; Laboratory; Preservice teachers; Teacher preparation

Introduction & Conceptual Framework

School-based agricultural education (SBAE) teachers have a wide range of responsibilities associated with their positions (Phipps, Osborne, Dyer, & Ball, 2008; Talbert, Vaughn, Croom, & Lee, 2014). These responsibilities often include managing the learning environment (Saucier, Vincent, & Anderson, 2014), training students for competitive events (Ball, Bowling, & Sharpless, 2016), and teaching agriculturally-based content (Roberts & Ball, 2009). These events can take shape in a variety of environments in, and around, a SBAE program. As part of this list of environments, and as a component of the complete model of SBAE programming (Croom, 2008), laboratory environments serve to connect classroom content to real-world applications (Phipps et al., 2008). Laboratories have long been a staple in SBAE programs (Twenter & Edwards, 2017),

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and a wide variety of facility types exists, including greenhouses, agricultural mechanics, livestock handling, and aquaculture (Shoulders & Myers, 2012).

Laboratory instruction can be an experiential learning process to help facilitate the growth of students’ intellectual and physical capacities (Shoulders, Blythe, & Myers, 2013). As such, laboratories, and laboratory-based activities, can serve as the context for a substantial variety of learning opportunities, including academic content application (Parr, Edwards, & Leising, 2006), problem-solving (Pate & Miller, 2011), hypothesis generation (Blackburn & Robinson, 2016), and inquiry-based learning (Thoron & Myers, 2012). Laboratories are typically designed to mimic industry-based settings to develop familiarity with tasks and work experiences aligned with real-world environments (Phipps et al., 2008). Laboratory-based activities frequently range in type, from servicing small engines in an agricultural mechanics facility to checking water quality in an aquaculture pond (Phipps et al., 2008). Considering these notions, teachers must be well-prepared to ensure laboratory environments are purposefully used. Prior experiences gained in a particular context (i.e., observations of a laboratory environment) can have ramifications on future pursuits (i.e., teaching in a laboratory environment) (Wells, Perry, Anderson, Shultz, & Paulsen, 2013). Teachers should be exposed to positive, adequate experiences during their teacher preparation programs (Whittington, 2005), or even before (i.e., as secondary students), to help ensure that well-informed, competent teachers are produced (Whittington, 2005).

Dewey (1938) suggested the quality of one’s education is related to the quality of one’s experiences. As such, Dewey (1938) further opined experience is a fundamental portion of the educational process, and that learning occurs through effective experiences. Decades later, Kolb (2015) expounded upon the notion of experiential learning, describing the process as a cycle in which the learner is actively engaged in the learning process through a series of four diametrically opposed modes of grasping and transforming experience to create knowledge. These modes are: 1) concrete experience; 2) reflective observation; 3) abstract conceptualization; and 4) active experimentation (Kolb, 2015). Knowledge is ultimately formed through the grasping and transforming of experience as the learner moves through the modes in the experiential learning process. (Kolb, 2015).

Fundamentally, experiential learning can be incorporated into SBAE in numerous ways (Baker, Robinson, & Kolb, 2012), including concrete experiences within the laboratory environment. As SBAE laboratories provide numerous outlets for high-quality learning that can be experientially-based (Phipps et al., 2008; Talbert et al., 2014), teachers should be well-versed in the laboratory environment’s potential utility, in the context of teaching and learning, in a modern SBAE program (Phipps et al., 2008). The use of the experiential learning process in teacher education (i.e., an early field experience [EFE] course) could be beneficial to the process of preservice teacher preparation (Baker, Culbertson, Robinson, & Ramsey, 2017; Rank & Smalley, 2017; Retallick & Miller, 2007), especially when considering their potential utility for shaping perceptions about a subject (i.e., laboratory environments in SBAE programs).

EFEs, as part of the experiential learning process for preservice teachers, are frequently used within SBAE teacher preparation programs (Retallick & Miller, 2007). Many potential benefits of participating in EFEs have been identified, but McIntyre (1983) identified six specific benefits of EFE for preservice teachers. McIntyre (1983) noted the benefits for preservice teachers included: 1) learning quickly if they enjoy working with students; 2) an experienced teacher can gauge a preservice teacher’s potential success as an future educator; 3) the opportunity to begin honing their teaching skills; 4) developing an understanding of a classroom environment; 5) the improvement of communication skills; and 6) the beginning of the transition from being a student to becoming a teacher. A great emphasis has been placed on the importance of EFE (Retallick &
Miller, 2007; Smalley & Retallick, 2012). Myers and Dyer (2004) highlighted that experiences such as EFEs assist preservice teachers in deciding their futures. Baker et al. (2017) noted EFEs can provide numerous, excellent opportunities to challenge preservice teachers’ preconceived notions about topics related to SBAE (e.g., teaching and learning in laboratory environments, etc.).

Smalley and Retallick (2012) suggested retention and recruitment of teachers could be improved with exploratory EFEs. A study conducted by Retallick and Miller (2007) focused on EFEs and concluded a requirement should be identified for an experience including a minimum number of EFE contact hours and number of lessons that should be planned and taught during the experience. Providing a quality experience is important for a preservice teacher to achieve a more desirable level of preparation for entry into the profession (Baker et al., 2017; Rank & Smalley, 2017; Smalley & Retallick, 2012). Laboratory environments represent a considerable portion of many SBAE programs (Shoulders & Myers, 2012); thus, it is expected preservice teachers be well-prepared to engage in laboratory-based instruction (Phipps et al., 2008; Shultz, Anderson, Shultz, & Paulsen, 2014).

Galbraith (2004) noted that adult learners (e.g., preservice teachers, EFE students, etc.) bring a wide range of diverse, unique experiences and backgrounds to the learning environment. As such, it could be surmised that preservice teachers (i.e., EFE students) exhibit these characteristics as well. Rank and Smalley (2017) noted preservice teachers enrolled in agricultural teacher preparation programs may not necessarily share experiences in all aspects of the modern SBAE model (i.e., classroom and laboratory instruction, FFA, and Supervised Agricultural Experiences [SAEs] [National FFA Organization, 2015]). In the context of the present study, we postulated that perhaps not all preservice teachers received the opportunity to engage in the diversity of laboratory environments included within modern SBAE programs (e.g., agricultural mechanics, greenhouses, livestock, apiaries, etc.). Moreover, some preservice teachers may have never been exposed to an SBAE program at all in their past experiences, as noted by Rank and Smalley (2017). It is imperative preservice teachers be well-versed, and well-prepared, in all facets of SBAE, including an understanding of teaching and learning in learning environments, as the move from the teacher preparation program into their own classrooms (Thoron, Myers, & Barrick, 2016). Interestingly, little work has been conducted to determine how, exactly, preservice teachers (i.e., EFE students) view the laboratory environment component of SBAE. Perhaps a need to identify how preservice teachers perceive the laboratory environment component of the SBAE model currently exists.

**Purpose & Objectives**

The purpose of this study was to identify the perceptions of preservice teachers enrolled in a field experience course in relation to the laboratory environment component of the SBAE model. Specific objectives were to:

1. Identify EFE students’ perceptions of what constitutes a laboratory environment in SBAE.
2. Identify and describe the meaning that EFE students ascribe to the laboratory environment as a component of a complete SBAE program.
3. Describe the change, if any, between the students’ initial expectations of their EFE and their reflection after the experience.

The present study aligned with Research Priority Five of the National Research Agenda (NRA) of the American Association for Agricultural Education (AAAE): Efficient and Effective Agricultural Education Programs (Thoron et al., 2016). Teacher preparation programs are designed
to facilitate the development of teacher candidates through a combination of field experiences, coursework, and student teaching (Whittington, 2005). The growing complexity of agricultural education programs, in both school-based and teacher preparation settings, dictates future practitioners (i.e., inservice teachers) will continue to have many needs related to knowledge and skill development (Thoron et al., 2016). Current preservice teachers must be adequately prepared through a variety of experiences (Baker et al., 2017; Rank & Smalley, 2017; Whittington, 2005), including EFES (Retallick & Miller, 2007). The need for quality teacher preparation programs in which effective experiences in agricultural education settings are provided exists; moreover, the need for well-rounded, well-informed, competent individuals who can effectively lead modern SBAE programs exists is great (Thoron et al., 2016). The present study focused on identifying and interpreting the perceptions of preservice teachers through an EFE course, with a targeted focus, via a modified photovoice process, toward addressing knowledge related to laboratory environments.

Methods

Preservice teachers enrolled in the AgEdS 211: High School Agriculture Programs (AgEdS 211) course were invited to participate in a modified photovoice process focusing on laboratory environments during their EFE. These preservice teachers were specifically selected for this study because they were in the beginning of their university-level teacher education coursework. As such, the participants had not yet taken any agricultural mechanics, curriculum planning, or teaching methods courses in which SBAE laboratory environments would have been discussed.

The AgEdS 211 course is an academic credit EFE course that consists of a 40-hour field experience and a reflective portfolio. This course allows undergraduate agricultural teacher education students the opportunity to observe a complete SBAE program. Over the course of the EFE, students were required to complete 10 specific required observations and choose two additional observations from a list of suggested observations. The students were also required to keep a daily reflective journal during the EFE. The reflective journal as well as reflections on the specific and optional observations were submitted as a portfolio at the end of the course.

Photovoice was selected as a medium for students to express their visions (Wang & Burris, 1997) as well as to obtain rich descriptive information (Catalani & Minkler, 2010) about various SBAE laboratory environments that would be encountered during the EFE process. The present study was initiated upon the receipt of Iowa State University Institutional Review Board (IRB) approval. Participation in the present study was voluntary and informed consent was obtained from the EFE students prior to participation. To protect the identities of the EFE students, pseudonyms were used in the place of actual names.

The modified photovoice process was explained to the participating EFE students ($N = 16$). The EFE students were asked to submit one photograph and a 250-word reflection/description depicting a laboratory environment that they observed during their 40-hour EFE placement site. The photographs and written reflections/descriptions were independently coded by each of us through using an open coding process to discover emerging themes (Merriam, 2009). Open coding is a constant comparative research method that can be used to analyze qualitative data (Merriam, 2009). Our intent in using open coding was to inductively code the EFE student’s reflections/descriptions while remaining open to anything the students perceived during their EFE, rather than deductively coding the EFE student’s responses based on predetermined themes (Merriam, 2009).
After completing the open coding process, we met to determine, and describe, the themes that emerged from our analyses. Independent coder review and peer debriefings were used by the research team to enhance credibility (Guba & Lincoln, 1989). Additionally, we discussed bracketing among ourselves to strengthen the trustworthiness of the study by identifying potential personal biases based on our own prior experiences (Merriam, 2009). As we are directly involved in the process of agricultural teacher preparation, we are all former SBAE teachers who taught in public high school settings in different states, and we extensively used laboratory environments as part of our instructional practices. Further, as researchers our diverse backgrounds and roles in the agricultural teacher education program at Iowa State University provided for a variety of expertise and interests in relation to different areas and steps of the teacher preparation process. One researcher teaches preservice agricultural mechanics coursework, another researcher serves as the Agricultural Teacher Education Coordinator and is directly involved with EFE students each semester, and the other researcher serves as an agricultural teacher educator at Arkansas Tech University and had previously served as the EFE coordinator at Iowa State University.

Findings

Sixteen ($N = 16$) EFE students participated in the photovoice process, which was conducted during an EFE course offered during the Fall 2017 semester. All of the participants in the present study ($N = 16$) were majoring in Agricultural and Life Sciences Education (AGLSE). The majority of the participants were female ($n = 15$). Additionally, the majority of the participants were classified as juniors ($n = 9$). Various laboratory environments were shown in the EFE students’ photographs. These environments included 11 agricultural mechanics laboratories, two classrooms, a land laboratory, two greenhouses, two plant science laboratories, and a makeshift livestock laboratory constructed within an agricultural mechanics laboratory. The qualitative analysis process resulted in the emergence of three distinct themes related to laboratory environments within SBAE programs.

**Theme One: Project-based Learning is Widely Used for Instructional Purposes**

The students noted no matter the laboratory setting, the facility served as an effective way to provide project-based learning. Megan observed an agricultural mechanics laboratory activity indicated, “This shop gives students the opportunity to have hands-on work, which I think is better for student learning. It gives students a physical object that they can look at. It gives students a physical problem that they can look at and solve.” Amy (see Figure 1) was impressed by the agricultural mechanics laboratory and explained,

This is the most impressive high school ag mechanical shop I have ever seen. When I walked in my jaw hit the floor. The students love this shop too, they look forward to coming out here and working on their projects. The tractors you are seeing have been donated by people in the community, through connections [TEACHER] has made over the years, and some from connections the students have made. The students will fix them up, from the inside out, and enter them at the state fair, and any other competitions they choose. The students start in ag mechanics working on smaller motors, such as the mower you can see. As their skills improve they move up to ag mechanics II, where they get to rebuild tractors, or anything else that gets donated. The students fixed it and now use as a work truck. They received another donated tractor, that did not run, they had to use the [COMPANY] work truck to go work on this tractor so they could get it back to their shop.
Regarding the agricultural mechanics laboratory environment, Janelle indicated, “It’s super cool to see their faces light up when they complete something right for the first time, and it was even more fun to see them shoot sparks and everyone get all excited.” Jack shared project-based learning as,

The students did single pull switches, double pull switches, different types of outlet boxes and they had to use different types of wire as well. The students had to start by wiring in the extension cord and they had a checklist of switches and outlets to hook up and test. These kinds of hands on experiences stick with people for a long time. Most teachers wouldn’t dive into a lesson like this to teach... I think this is a very beneficial activity for the students to do. Later down the road, both the male and female students could be able to fix their own wiring problems and make sure that things are safe when buying a home.

Mary indicated (see Figure 2), “I think that being able to do hands on work with simple scientific tools is essential to high school students.” Emily shared,

A teaching laboratory is a great use of hands on learning. This can be enhanced by the use of a shop or greenhouse facility. It gives students the chance to learn about sciences and practical skills in a place that isn’t a classroom. Hands-on learning is the mission in agriculture education and this cannot be carried out through regular classroom learning. Through my observations, they also teach students how to use certain tools and how to cooperate with each other. In most labs, cooperation is key to completing the lab successfully.

Figure 1.  

Figure 2.

Theme Two: Laboratory Environments are Set Up and Arranged in Particular Fashions Based on Needs

Observing in a laboratory provided EFE students with the opportunity to see first-hand how a laboratory environment may be set up and arranged. Tina specified (see Figure 3), “Large benches allow students to have room they can spread out while still sharing tools with others... There are
retractable extension cords that hang from the ceiling which allow students to plug in power tools.” Becky noted specifics of their classroom shop settings,

Directly walking into the shop to the right are tables used in woods class for woods project. On the far right of the shop there are metal tables used in woods class for woods projects. To the left of the garage door there are several welders in separate spaces for kids in industrial tech class. Scattered around the shop are several machines and tools that students can use to cut wood, weld, or construct projects.

Students noticed specific facility orientations, which was expressed by Karl, who indicated that, “The welding shop is set up in a very industrial matter…Inside each booth each student has a table and a welder.” Casey viewed a classroom set up and indicated, “There are no chairs with the table. This makes each student more productive and able to work.” Becca (see Figure 4) indicated, “I believe that the shop is an effective learning environment for students involved in the Ag Mechanics class… An open shop leaves less room for distractions by other students.” Mary shared, “While it may be in an inconvenient location the students have a very nice facility to weld in with new curtains and welders. In addition, all of the CASE curriculum monitors and monitors that are inside the wood cabinets are very useful for agricultural sciences.”

**Figure 3.**

**Figure 4.**

**Theme Three: Laboratory Environments are Arranged as Settings for Effective Learning**

Students recognized the importance of keeping SBAE students accountable by ensuring that the laboratory environment was clean, organized, and safe. Jess noted (see Figure 5), “Just like his classroom the lab is always clean and [TEACHER] asks the students to be responsible and put the equipment they use away.” Michael said, “The shop includes many blue screens so when welding outside of the booth safety standards can still be met.” Amy focused on the skill development within the learning environment, as she indicated (see Figure 6),

Keeping up on the greenhouse takes a lot of work through. When there are long weekends off from school, a student is required to go to the greenhouse and water the plants. Also, students have to make sure the greenhouse is clean at all times,
up to the standards of the school, and managed appropriately to make sure that all of that plants are in good condition. Having this type of responsibility teaches students a lot about themselves.

Interestingly, Ashley viewed a cemetery as a learning environment and indicated: I have attached a photo of us at the cemetery. I have attached this photo to prove that you do not need a specific facility, to have an optimal learning laboratory. We have taken the school bus to the cemetery and had taught lessons there about GeoCaching and the kids had a blast. Another class had been out to observe a field to determine crop residue and had hands on learning.

The arrangement of the laboratory environments to facilitate a variety of learning experiences challenged some EFE student’s expectations. Maria commented, “When I learned this was the lab, or what I would have referred to it in as school as the “shop”, I was shocked. There were no woodworking supplies in sight, just welding and plant science instruments”. Similarly, Meghan wrote, “This is absolutely amazing that this chapter has such an elaborate ag mechanics program set up for their students. I believe this more so than some probably because my chapter never had anything like this.”

Conclusions, Discussion, Implications, & Recommendations

Being frequently used as part of the teacher preparation process, EFEs help to connect preservice teachers to the orientations of actual SBAE programs (Retallick & Miller, 2007). Moreover, and more importantly, EFEs help to ground preservice teachers in the realities of many SBAE programs (Rank & Smalley, 2017). As part of these realities, SBAE programs throughout the United States often do, and have since their inceptions, used laboratory environments as ways to connect classroom learning to real-world phenomena (Phipps et al., 2008; Twenter & Edwards, 2017). Thus, teachers must be prepared to engage in these environments themselves as facilitators of the learning process (Talbert et al., 2014). Experiences are fundamental to the learning process (Dewey, 1938), and experiential learning opportunities, such as those that occur as part of the EFE
process, help to connect individuals to way to acquire knowledge and skills through engagement through experiences (Kolb, 2015).

In the context of an EFE course at Iowa State University, it was apparent that the EFE students’ perceptions of SBAE laboratory environments were quite diverse, as their reflective/descriptive summaries of their respective environments were focused on varied aspects. The three dominant themes that emerged from the qualitative data analysis process were: 1) project-based learning is widely used for instructional purposes; 2) laboratory environments are set up and arranged in particular fashions based on needs; and 3) laboratory environments are arranged as settings for effective learning. Within these three primary themes, several different less-frequently reported concepts emerged within several EFE students’ reflective/descriptive summaries. These concepts included the challenging of, and differences between, initial expectations and assumptions, the laboratory environment as a domain for skill development and learning, and the reinforcement of prior beliefs.

Interestingly, as these data were coded and conceptualized the three dominant themes that emerged during the analysis of each EFE students’ reflective/descriptive summary, a common thread flowed through each of the three themes was the challenging or supporting of existing initial assumptions. The students were in the beginning of their teacher education program. Therefore, the student’s initial assumptions were based on their lived experience rather than programmatic coursework. This is certainly a noteworthy observation, as Baker et al. (2017) discussed the challenging of initial assumptions and pre-conceived notions is an important component of EFEs used within agricultural teacher preparation programs. As part of the teacher education process, EFEs can serve as guideposts for preservice teachers as they evolve into their professional selves (Myers & Dyer, 2004). Further, as EFEs in agricultural teacher preparation programs may be the first point of SBAE program contact that some preservice teachers may have (Rank & Smalley, 2017); thus, it is imperative that potentially negative ideas, conceptualizations, or perceptions about laboratory environments in SBAE programs be dismantled and, over time, dealt with in a proactive manner. We were certainly pleased to see this particular population of EFE students viewed the laboratory environments as holistically connected to the rest of the SBAE programs that they visited.

As photos and written reflections were observed for the study, several interesting concepts were observed. One of these observations related to the laboratory environments that the EFE students selected. We noticed several of the laboratory environments photographed, and subsequently documented in the EFE students’ reflective/descriptive summaries, were agricultural mechanics-oriented. This observation left us with some questions. Did the EFE students see this as the primary representation of a SBAE laboratory environment? As agricultural mechanics is a traditional staple in many SBAE programs (Burris, Robinson, & Terry, 2005), it is conceivable most of the programs in which they conducted their EFEs may happened to have agricultural mechanics laboratories. Many students’ impressions of an active, traditional SBAE program in Iowa may include the use of available agricultural mechanics laboratory environments. Could this relate to a potential belief that many SBAE programs in Iowa may still mimic the curricula, designs, and purposes of a bygone era of SBAE that was heavily focused on agricultural mechanics and was production-oriented (i.e., vocational agriculture)? Moreover, does it indicate that these EFE students view agricultural mechanics as an important driving force in many SBAE programs in Iowa, or could it be indicative of these EFE students’ interests in this curriculum area? As many preservice teachers have anxiety about teaching in an agricultural mechanics laboratory (Tummons, Langley, Reed, & Paul, 2017), this last question is of particular interest. These questions deserve follow-up through both qualitative and quantitative research.
In two instances, students noted classroom environments were, from their perspective, laboratory environments. Some notations even existed describing that laboratory environments are not bound by a facility type or a physical structure, but instead are characterized by how the space is used. Such ideas indicate these EFE students were quite expansive in their definitions of laboratory environments. Further, these EFE students recognized many settings not traditionally recognized as laboratory environments (e.g., the cemetery, the classroom, etc.) can indeed serve as laboratory environments for teaching and learning purposes. While not typically identified as laboratory environments (Phipps et al., 2008; Shoulders & Myers, 2012; Talbert et al., 2014; Twenter & Edwards, 2017), perhaps these settings can provide teaching and learning experiences that are as equally valuable as those within traditionally-recognized SBAE laboratory environments.

Many of the EFE students noted how the learning of different topics (e.g., skill development, facility management, etc.) occurred in each laboratory environment. These observations are important and foundational to the purposes of laboratory-based instruction. As laboratory environments serve, and have done so for decades (Twenter & Edwards, 2017), to connect theoretical concepts to hands-on, minds-on instructional practices (Phipps et al., 2008), as well as potentially serve as a source for experiential learning (Shoulders et al., 2013), it is vital preservice teachers understand how laboratory environments are, from a philosophical standpoint, meant to be incorporated into the complete modern SBAE program.

It is conceivable many programs may not adequately use their laboratory environment space in a manner consistent with the agricultural education profession’s conceptualizations of what a laboratory environment is, and what it should be used for. For example, we can, from an anecdotal perspective, recall visiting numerous SBAE programs in different parts of the nation and seeing how some laboratory environments were being used as storage spaces for the SBAE program or, perhaps even more troubling, for the remainder of the school campus classrooms. In some instances, laboratory environments were underused or misused, with minimal focus on teaching and learning, but instead being viewed as profit centers for the local SBAE program or school. Research following up on these particular issues would be useful to the profession. Regarding the EFE students in the present study, however, we found it encouraging that there were many positive attributes about the use of the laboratory environments that they observed. We hope that as these EFE students continue down the path of teacher preparation, their understanding of how to best incorporate laboratory-based teaching and learning into modern SBAE programs will continue to grow.

Laboratory environment set-up was mentioned frequently by the EFE students. In particular, the EFE students made mention of how laboratories were clean, organized, and well-maintained. This served as an interesting discussion point, as laboratory management remains an important topic in SBAE programs (Saucier et al., 2014) and teacher preparation (McKim & Saucier, 2011). As indicated by the EFE students in the present study, prioritizing the care of individual laboratory environments can positively contribute to the valuing of the settings as places of high-quality teaching and learning, which includes creating good impressions for outsiders coming to observe the environments. Moreover, several EFE students discussed in their reflective/descriptive summaries the value of caring for the facilities and crafting a positive image for the work done there. We hope these impressions last as these EFE students enter the profession as new teachers. Properly managing facilities is paramount to ensuring their long-term usage within a SBAE program (Saucier et al., 2014). Because stakeholders (e.g., parents, school administrators, students not enrolled in the local SBAE program, etc.) bear witness to the state of repair (or disrepair) and use of laboratory environments (or lack of use), laboratory environments need to be well-maintained and used to help present in professional image of the SBAE program (Phipps et
The EFE students in the present study seemed to recognize this within their placement sites. As a result of the experiential learning process (i.e., the EFE course), perhaps these ideas will remain at the forefront of these EFE students’ minds as they begin their teaching careers.

Interestingly, several EFE students noted there was a connection between the use of project-based learning and laboratory set-up. Project-based learning is focused on the use of projects as a context through which to teach underlying principles (Larmer, Mergendoller, & Boss, 2015). Examples of suitable projects in the context of a SBAE program could include caring for livestock in a school livestock handling laboratory, wiring electrical circuits in an agricultural mechanics laboratory, or cultivating field crops as part of a test plot on a land laboratory. Moreover, project-based learning has been a traditional staple of teaching and learning in SBAE settings (Phipps et al., 2008; Talbert et al., 2014). As an instructional strategy, project-based learning serves as an excellent engager and motivator of students, allowing for a variety of teaching and learning approaches that help to prepare students for their lives beyond high school (Larmer et al., 2015). We were encouraged to see several EFE students in the present study noticed the laboratory environments in which they observed were set up to facilitate project-based learning.

We recalled how Amy was in awe of the agricultural mechanics laboratory presented in Figure 1; moreover, she easily identified how secondary students at her placement site were frequently engaged in hands-on projects (e.g., tractor repairs, etc.) that challenged their thinking and their abilities to work together. Other EFE students’ stories were similar, noting that using projects as a teaching and learning tool was vital to the educational process. The SBAE teacher is responsible for a variety of tasks, including laboratory set-up, management, and ensuring that materials for learning experiences (i.e., such as those offered through project-based learning) are available and ready for use (Saucier et al., 2014). Preservice teachers should be prepared to structure their curricula, learning environments (including laboratories), and available resources to meet the needs of their students (Whittington, 2005).

We recommend agricultural teacher preparation programs adopt EFE coursework as part of their programs of study, if such efforts have not been undertaken already. EFEs are beneficial to preservice teachers (McIntyre, 1983) and help to connect them to colleagues already in the profession (i.e., inservice teachers) and expose them to the realities that surround teaching in, and leading, an SBAE program. Further, we recommend agricultural teacher preparation programs should ensure EFEs are providing adequate exposure to topics prevalent within modern SBAE programs. As EFEs are designed to be impactful experiences that can help to guide preservice teachers’ career directions (Myers & Dyer, 2004; Retallick & Miller, 2007; Smalley & Retallick, 2012), supervising teacher education faculty and EFE coordinators should work to ensure the experiences are of adequate quality and will expose preservice teachers to the complexities of modern SBAE programs.

Moreover, those individuals responsible for EFE placements should work to ensure strategic decisions are being made to best facilitate the professional growth and development of preservice teachers. Placing preservice teachers in low-quality SBAE programs could lead to poor perceptions about the quality of programs, facilities, and curricula beyond a particular placement. This could be especially destructive for preservice teachers whose backgrounds do not include enrolling in SBAE programs as secondary students, as perceptions may easily become reality. In addition, exposure to low-quality programs may inadvertently, and negatively, impact preservice teachers’ motivations to continue toward a teaching career. Conversely, placing preservice teachers in high-quality SBAE programs may be more ideal, as exposure to more complete, better-quality SBAE programs may assist in maintaining, or even enhancing, preservice teachers’ motivations to pursue education as a career. EFEs are meant to challenge pre-conceived ideas about SBAE (Baker et al., 2008).
et al., 2017); however, those responsible for EFE placements must be cognizant that some preconceived ideas are worth more than others.

We recommend future research should include replication of this study to better understand EFE students’ experiences, assumptions, and expectations in relation to laboratory environments. Photovoice can be an excellent tool to explore preservice teachers’ perceptions about the realities of modern SBAE programs (Rank & Smalley, 2017); thus, we recommend agricultural education scholars continue using this research method when conducting such inquiries. Additional efforts to expound upon the questions asked within the present study should be made as well. Conducting both qualitative and quantitative research will help to increase the body of knowledge related to EFEs and the role they play in agricultural teacher preparation programs. Possible quantitative research could include the development of a questionnaire for inservice teachers which addresses how they incorporate laboratory-based teaching and learning experiences within their respective programs. As laboratory-based instruction is, and has long been, a foundational part of the modern SBAE program model (Shoulders & Myers, 2013; Twenter & Edwards, 2017), further understanding exactly how inservice teachers are using such practices could help to more fully define how EFEs could be operationalized as both a teaching and a learning tool. Further, a combination of qualitative and quantitative research explorations into these broad topics could lead to the development of a model for delivering teaching and learning experiences in laboratory environments, with a particular focus on how EFEs serve to prepare preservice teachers for that role.

Teacher education programs, as part of the broader field of agricultural education, must continue to remain focused on preparing high-quality teacher candidates (Whittington, 2005). Moreover, these programs, as part of a broader mission to serve as effective and efficient in their scope, function, and purpose (Thoron et al., 2016), must continue to evolve. EFEs, such as the one described in the present study, can help to create lasting impressions on preservice teachers (Baker et al., 2017; Rank & Smalley, 2017). To remain relevant, agricultural teacher preparation programs must continue providing exceptional learning opportunities for preservice teachers so they, in turn, can do the same for their forthcoming secondary students (Thoron et al., 2016; Whittington, 2005). Perhaps quality instruction facilitated in laboratory environments is part of that process.

References


Levels of STEM Integration through Agriculture, Food, and Natural Resources

Hui-Hui Wang1 & Neil A. Knobloch2

Abstract

The purpose of this action research study was to develop a rubric that identified levels of integrated science, technology, engineering, and mathematics (STEM) lessons through agriculture, food, and natural resources (AFNR) lessons that were developed and implemented in afterschool programs by preservice informal educators. The research study expanded on the knowledge base by identifying three levels and six features of integrated STEM through the context of AFNR. Using the rubric, we analyzed 10 mini-units, consisting of 27 lesson plans, of STEM integrated AFNR lesson plans that were developed by preservice informal educators. There were three major findings. First, teaching AFNR content and skills was the main focus of integrated STEM lesson plans. Second, the lesson plans attempted to use real-world problems to connect students' learning to use content knowledge and skills to solve the problem, yet failed to connect other disciplines. Finally, students who had previous teaching experiences in non-formal and informal settings achieved the highest scores, but students who were in formal teacher preparation programs had the lowest scores in terms of developing integrated STEM through AFNR lesson plans.

Keywords: STEM integration; interdisciplinary learning; nonformal teaching methods

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Introduction

Interest in research around integrated science, technology, engineering, and mathematics (STEM) curriculum and instruction has been rapidly growing because of: (1) the demand for STEM-related jobs, especially in agriculture, food, and natural resources (USDA, 2015), (2) the Next Generation Science Standards (NGSS, 2013) encouraged teachers to use integrated learning in science education, and (3) increased funding to support interdisciplinary research and education on STEM teaching and learning through formal and informal education (Gonzalez & Kuenzi, 2012). Integrating STEM through AFNR is not a new idea for educators. School-based agricultural education (SBAE) was predominately science-focused 30 years prior to the passage of the Smith-Hughes Act in 1917 (McKim, Lambert, Velez, & Balschweid, 2017). The presence of science in SBAE was taught because some teachers chose to keep it a focus in the vocational agriculture curriculum (NRC, 1988). In 1963, the Vocational Education Act broadened the focus of the vocational agriculture curriculum to focus on integration in career and technical education and include additional occupational areas (NRC, 1988) with science connections such as horticulture, forestry and natural resources, food processing, agricultural technology and mechanization (Phipps, 1988).
These occupational areas have evolved to be known as career pathways that represent the agriculture, food and natural resources career cluster, including agribusiness systems; animal systems; environmental service systems; food products and processing systems; natural resources systems; plant systems; and power, structural and technical systems (The Center to Advance CTE, 2017).

Nearly 30 years ago, the Committee on Agricultural Education in Secondary Schools (NRC, 1988) recommended the focus of Agricultural Education be changed and agricultural topics and concepts be incorporated into the existing K-12 curriculum. These recommendations resulted into two initiatives that are germane to topic of integrated learning in agricultural education. Agriscience education was the precursor to what has been discussed as agricultural STEM learning, and agricultural literacy was a contextualized approach to multidisciplinary learning (Spielmaker & Leising, 2013). Researchers have studied both integrated approaches in AFNR. For example, high school agriculture teachers claimed that it is natural to integrate STEM in agriculture, and they have done so in their lectures and activities almost every day (Stubbs & Myers, 2015), yet McKim and his colleagues questioned how effective agriculture teachers are in teaching science knowledge and stated, “SBAE as a whole is not meeting the vision to connect science and society” (McKim et al., 2017, p. 105). Moreover, the results among elementary teachers are mixed. Some elementary teachers saw the value and relevance of using AFNR as context in their instructional materials (Knobloch, 2008; Knobloch, Ball & Allen, 2007); however, some elementary teachers neither saw that agricultural topics supported their STEM education objectives nor aligned with the academic standards (Graves, Hughes, & Balgopal, 2016).

Although learning about AFNR provides a context for integrated learning, it can be especially challenging for teachers. The current educational system puts up barriers for cross-disciplinary collaboration, and creates a challenge that agricultural teachers lack science knowledge to integrate science into their classes (Baker, Bunch, & Kelsey, 2015). Likewise, STEM teachers are not trained to use agricultural contexts in their classrooms (Graves, Hughes, & Balgopal, 2016). Despite of having positive perceptions about integrated curriculum, some educators have not used integrated curriculum in their teaching (Lehman, 1994), nor they have enough knowledge to create one (Mason, 1996). Overall, integrated STEM through AFNR is an ambiguous concept and there are few standards to follow or be used to assess the level of integration, if educators are interested in teaching integrated STEM through AFNR.

Current literature that supports STEM integration focuses on integrating engineering with science, technology, and mathematics. For example, the frameworks for the NGSS (2013) clearly articulate the role for engineering and technology in science education moving the conversation from the broad recommendations of national documents toward action. Integrative STEM education appears to use engineering design-based approaches that intentionally integrated science and/or mathematics content to solve real-world design problems (Bryan, Moore, Johnson, & Roehrig, 2016; NRC 2014). Although many researchers and educators agree that engineering acts as an integrator to bridge science and mathematics in integrated STEM curriculum and instruction, one of the biggest challenges is that few general guidelines or no framework exist for teachers to follow regarding STEM integrated curriculum and instruction design. For example, in terms of integrating STEM through AFNR, no guidelines or framework exist on how, and to what degree, STEM content areas might be integrated with AFNR. Research on integrating STEM through AFNR has not kept pace with the educational reform. There is a clear need for a tool or rubric that provides guidance for researchers and educators to design and evaluate integrated STEM lessons.

The purpose of this study was to develop a rubric that would provide preservice informal educators feedback on integrated STEM lessons through AFNR. The study was guided by two
research questions: (1) What were levels and supporting descriptions of integrated STEM education through AFNR? (2) What were the levels of STEM integration of 27 lessons representing 10 sample mini-units that were developed for afterschool programs?

**Literature Review and Conceptual Framework**

Agriculture, food and natural resources is an educational career cluster that represents a broad and comprehensive field that has been historically known as agriculture, broadly defined (NRC, 1988; The Center to Advance CTE, 2017). AFNR was purposefully included with STEM integration for several reasons. First, AFNR are “intertwined with other disciplines in the natural and social sciences” (National Research Council, 2009, p. 4). Second, AFNR provides contexts (Roberts & Ball, 2009) to integrating various STEM disciplines (Stubbs & Myers, 2016) by helping students see concrete applications of abstract science and mathematics concepts (Smith, Rayfield, & McKim, 2015). Third, AFNR helps facilitate learning experiences by engaging students to solve complex grand challenges, such as food security, bioenergy, sustainability, and climate change, and helping students see the interrelatedness of single disciplines (Barnosky, Ehrlich, & Hadly, 2016; Warburton, 2003). Finally, AFNR facilitates transdisciplinary learning and systems thinking (Francis et al., 2011; Schneider & Rist, 2014; Scott, Kurian & Wescoat, 2015).

Developing a precise definition of integrated STEM education has been a challenge (NRC, 2014). Many educators consider STEM integration as use of the four disciplines in their teaching, but they were not clear on how to execute the implementation (Breiner, Harkness, Johnson, & Koehler, 2012). They focused their integrated STEM curriculum and instruction on improving students’ science and mathematics learning with little integration of technology or engineering (Bybee, 2010; Wang, Moore, Roehrig, & Park, 2011). Smith and Karr-Kidwell (2000) pointed out integrated STEM is “a holistic approach that links the disciplines so the learning becomes connected, focused, meaningful, and relevant to learners” (p. 22). In order to make STEM integration meaningful to learners, integrated STEM approaches need to combine some or all of the four disciplines and use real-world problems that relate to learners’ everyday lives, and learners need to be given opportunities to solve the problems (Bybee, 2010; Moore, et al., 2014; NRC, 2014). Regardless of the various definitions of STEM integration, engaging learners in complex and interdisciplinary real-world challenges has been a common theme. Agricultural grand challenges that humans face today are complex and interdisciplinary real-world problems (NRC, 2009), and these challenges provide context to integrating some or all of the STEM disciplines (Stubbs & Myers, 2016). Therefore, AFNR challenges could potentially fulfill the definition of STEM integration from current literature to help educators facilitate STEM integrated learning experiences by engaging learners to use some or all of the four disciplines to solve complex interdisciplinary real-life problems.

Although teachers believe curriculum integration helps students to connect school learning with their personal lives and future work (Hargreaves & Moore, 2000; Mason, 1996; Schlechty, 1990), it raises a number of practical questions, such as what does integration really mean? Does integration need to present in each lesson plan or in a large unit? Recognizing the need for a model of integrated STEM education, National Academy of Engineering (NAE) and the Board on Science Education of the National Research Council (NRC) convened a committee to identify and characterize current approaches to integrate the STEM disciplines (NRC, 2014). The committee constructed a framework to help characterize and clarify selected STEM programs. The framework provided a broad guideline and lacked detailed criteria for educators to follow. For example, in the framework, one of the goals of integrated STEM education is to increase students’ ability to make connections among STEM disciplines. The framework suggested that the instructional materials need to help students recognize the connections, and combine practices from two or more STEM
Many educators and scholars believe that STEM integration means teaching science and mathematics by integrating engineering and technology into the regular curriculum (Ramaley, 2007). The NGSS (2013) performance expectation offered a tight integration of eight science and engineering practices, which recommends students be required to make deeper connections between science and engineering. Echoing the performance expectation that NGSS has defined, Bryan and her colleagues (2016) identified five characteristics of a quality integrated STEM educational experience: (1) the content and practices of science and/or mathematics serves as an anchor discipline and defines some of the primary learning goals; (2) engineering design and practices of engineering serve as an integrator by providing a context and/or an intentional component of the content to be learned; (3) the engineering design output (i.e., process or product) requires the scientific and mathematical concepts to be included in the design justification; (4) the development of 21st century skills is emphasized; and, (5) the context of instruction requires solving a real-world problem or task through teamwork and communication. Bryan and her colleagues stated that quality of STEM integration depends of three key ideas. First, teachers need to meaningfully integrate STEM contents by providing coherence between the instructional activities and learning outcomes. Second, real-world design problems act as the integrator that meaningfully bridges students’ learning and applying other disciplines, such as science and mathematics. Finally, pulling from what students have learned and their prior experiences, teachers help students think outside the box, and use their judgment and critical thinking to make decisions when they solve design problems.

Vasquez and her colleagues (2013) modified Drake and Burns’ (2004) definition of STEM integration, and developed three approaches to design integrated STEM curriculum units. The three approaches are multidisciplinary, interdisciplinary, and transdisciplinary. Vasquez and her colleagues used seven categories to identify the differences among the three approaches to integrated STEM. These categories are organizing center, development of the content, role of the disciplines, role of teacher, learning goals, degree of integration, and assessment. For example, in the learning goal category, multidisciplinary focuses on “discipline-specific concepts, and skills.” Interdisciplinary centralizes “concepts and skills that bridge between the disciplines.” As for transdisciplinary, concepts and skills are used to “bridge between the disciplines, real-world contexts, and students’ interests and concerns” (p. 74). Overall, multidisciplinary is the lowest level and transdisciplinary is the highest level of STEM integration. Some recognizable differences between the lowest level (i.e., multidisciplinary) and the highest level (i.e., transdisciplinary) of STEM integration are described as three levels. First, the lowest level of STEM integration clearly maintains the identities of S, T, E, or M and STEM content and skills are taught independently. The highest level of STEM integration, on the other hand, breaks or blurs the disciplinary boundaries of STEM using a real-life problem/project. Second, the lowest level of STEM integration is more teacher-centered, which teachers take the lead instruction and decide the content and skills that should be learned. As for the highest level STEM integration, it is more student-centered, which teachers act as facilitators to facilitate students’ learning across disciplines, and students are invited to fully or partially determine the content and skills to be learned, and/or the direction of the design project. Finally, in terms of learning goals, the lowest level of STEM integration focuses on discipline-specific concepts and skills, and the highest level of STEM integration focuses on concepts and skills that bridge between the disciplines within real-world contexts. Although the continuum of STEM approaches to curriculum integration from Vasquez and her colleagues provided some guidelines to guide educators to develop integrated STEM curriculum, when we tried to use the framework to analyze the level of our students’ integrated STEM through AFNR mini-units, we encountered some critical challenges. For example, one of
the criteria that Vasquez and her colleagues used to separate the lowest and the highest level of STEM integration is by checking if the curriculum includes the real-life context and challenges. As we stated earlier, agricultural challenges are real-life challenges. Therefore, based on this criteria, all the integrated STEM through AFNR mini-units that the preservice informal educators developed fall into the highest level of STEM integration. This framework lacked detailed features that could be used to evaluate the level of integrated STEM through AFNR curriculum units. Therefore, we modified Vasquez, Sneider and Comer’s work (2013) to construct a new rubric that could be used to guide and evaluate the level of STEM integration through AFNR.

Research Methods

Action research was chosen as the research method for this study because it is designed to bridge the gap between research and practice (Smoekh, 1995). Two instructors co-taught a three-credit, semester-long graduate-level course and engaged in critical reflection and peer-debriefing throughout the two semesters they taught the course. The instructors framed this innovative course as interdisciplinary learning (Ivanitskaya, Clark, Montgomery, & Primeau, 2002) for the development of integrated STEM through AFNR lessons. Students’ comments and questions raised during the course prompted the instructors to dig deeper to understand the features, levels and evidences of teaching integrated STEM through AFNR. Throughout these debriefings, the instructors realized they were engaged in thinking in action because action research is an engaging tool for practitioners to use to study problems scientifically to evaluate, improve and steer decision-making and practices (Corey, 1953). As such, the two instructors studied how to better inform their teaching strategies based on carrying out self-reflective inquiry (Carr & Kemmis, 1986), such as students’ comments and interpretations of the content, STEM integration, classroom activities, and lesson plan and teaching assignments. The course was taught twice in a two-year period and the instructors engaged in critical reflection during and after the course was taught (Kraft, 2002). The two instructors had different yet complementary teacher education training and professional teaching experiences. One instructor had a doctorate degree in science education with an emphasis on integrated STEM education and teacher professional development. The other instructor had a doctorate degree in agricultural education and had previously taught a teaching methods course with an emphasis on learner-centered teaching strategies.

Although the disciplinary training and teaching experiences of the two instructors were different, their interests and theoretical perspectives were complementary in developing an integrated STEM teaching methods course. The two professors were informed by a pragmatist perspective (Johnson & Onwuegbuzie, 2004) and engaged in praxis by conducting reflective research (Alvesson & Sköldberg, 2017) of their practice and with preservice informal educators. In doing so, the instructors recursively assessed the relationship that exists between “knowledge” and “the way of doing knowledge” in the context of the course (Calas & Smircich, 1992). In the first year, the instructors developed and framed the course, which was supported by lessons, examples, classroom activities and course assignments. In the second year, the instructors refined lessons and classroom activities to help students more clearly understand the features of integrated STEM learning. The instructors reflected on students’ reflections and lessons, which pushed their thinking to more effectively communicate the features, evidences, and levels of integrated STEM learning. It became evident that the students had different interpretations of integrated STEM learning, which pushed the instructors to more deeply understand the students’ interpretations and realized the students interpreted levels of integration as a checklist evaluation rather than thinking more holistically about the integrated learning experience. As such, the two professors clarified the features of integrated STEM based on what the current literature stated regarding integrated STEM.
The students, who are interested in becoming informal/non-formal educators and learning how to teach STEM through AFNR, in Purdue University College of Agriculture were research participants. Students developed STEM integrated lesson plans through AFNR and they implemented the lesson plans with upper elementary students in afterschool programs. Different examples of STEM integration were shared in the course to generate discussion of the different characteristics of STEM integration through AFNR instruction. Students were instructed that no existing integrated model is the best model to teach STEM through AFNR, and they had freedom to develop their own STEM integrated lesson plans.

A total of 15 students enrolled the course in two years and had a variety of previous teacher preparation and teaching experiences. Overall, three students were in formal teacher preparation programs, six students had taught at non-formal and informal settings before, and six students had limited to no teaching experience. Students were given the choice to developing their lesson plans as individuals or as teams of two educators. Five students created individual lesson plans, and 10 students paired up to co-develop their lesson plans. Each student, regardless if they worked individually or as a team, was asked to create the equivalent of 90 minutes of instruction known as a mini-unit (i.e., one 90-minute lesson plan or two 45-minute lesson plans). Students taught at least one integrated STEM lesson to elementary students in an afterschool program.

A total 10 mini-units consisting of 27 lesson plans were used as data sources. Two mini-units were single 90-minutes lesson plans (Happy Cows, Happy House, and Operation Separation). Three mini-units consisted of two (Buzz on Bees) and four (Science with Stella the Great and Bruno Uptown Funk Boss, and Healthy Food, Healthy Life) lessons that were 60 minutes in length. Five mini-units consisted of two (Agriculture and Food, and Exploring Your Natural World), three (The Great Forest Controversy), and four (Food and Water System, and Where’d You Get That?! By-products of Animals in Agricultural Settings) lessons that were 50 minutes in length. In total, there were two lessons (90 minutes in length), 10 lessons (60 minutes in length), and 15 lessons (50 minutes in length).

Data analysis focused on identifying the levels and evidences of STEM integration for each criteria of the integrated STEM through AFNR rubric, which resulted in an overall mean of the level of STEM integration for each of the 27 lesson plans. The constant comparative method selective coding (Strauss & Corbin, 1990) was used to identify Levels 1, 2 or 3 of each feature. All 27 lessons were reviewed independently by the two researchers. Ratings (i.e., Levels 1, 2 or 3) were identify for each feature at the lesson plan level. Means and standard deviations were computed at the lesson plan level and also at the mini-unit level for mini-units that had two to four lessons. After central concepts were generated from the selective coding, based on the central concepts, the language of description of each feature were identified. To ensure the trustworthiness of the qualitative analysis, interrater peer debriefing was conducted. Two authors of the study independently coded all of the lessons using the rubric. Each author rated each lesson using the six features and entered the ratings into an Excel® spreadsheet, which also served as an audit trail. Upon independent review of the two raters, intraclass correlation coefficient was computed to determine inter-rater reliability, which was high at 0.96. Regarding disagreements, the two raters engaged in peer debriefing until consensus was reached for discrepancies of codes, concepts, and description of each feature.

Results

Regarding Research Question 1, four features emerged from the current literature: (1) Goal of STEM integration; (2) STEM concepts, content knowledge, and skills; (3) learning outcome of STEM integration; and, 4) role of teachers. First, goal of STEM integration is one of the features
that was described from a descriptive framework (NRC, 2014) and the framework of three approaches to design integrated STEM curriculum units (Vasquez, Sneider, & Comer, 2013). The literature defined the goal of STEM integration as “instructional materials need to help students recognize the connections, and combine practices from two or more STEM discipline to solve a problem” (NRC, 2014, p. 37), and “concepts and skills that bridge between the disciplines, real-world contexts, and students’ interests and concerns” (Vasquez, Sneider, & Comer, 2013, p. 74). Although the goal of STEM integration is important, in order to apply this feature to lesson plan level, the two instructors discussed and decided to use the language of Role of Integration in Learning Objectives. Learning objectives play an important role in providing focus of lessons and helping to define the learning outcomes (Gagne, Wager, Golas & Keller, 2005). Combined the key points from the current literature, the definition of the role of integration in learning objectives is “learning objectives apply STEM knowledge to solve problems.”

Second, STEM concepts, content knowledge, and skills focused on the role of knowledge. The definitions of STEM integration from current literature that described STEM concepts, content knowledge, and skills were “apply knowledge of mathematics, science, and engineering, an ability to design and conduct experiments, as well as to analyze and interpret data...” (Sanders, 2009, p. 4), “engage in practices to build, deepen, and apply their knowledge of core ideas and crosscutting concepts” (NGSS, 2013, front page of the website), and “the practices of engineering and engineering design provide real-world, problem-solving contexts for learning and applying science and mathematics, as well as meaningfully bring in other disciplines” (Bryan, et al., 2016, p. 25). The definitions of STEM concepts, content knowledge and skills are interwoven with many aspects in most definitions. After several discussions, the two instructors found that these definitions could be divided into two subcategories, which were presence and usage. In order to apply this feature to lesson plan level, the two instructor changed the feature to Role of STEM Concepts, Content Knowledge, and Skills—Presence and Usage. Synthesized the definitions from the current literature, the definition of the presence is “core disciplinary STEM concepts and skills are considered as prior knowledge, and are naturally and meaningfully used/applied to solve problems or multiple STEM disciplines are difficult to distinguish as separate disciplines because they closely interdependent.” As for usage, we defined it as “use of STEM content knowledge is used to analyze and interpret the problem. Content knowledge is integrated, synthesized or transformed into some kind of tools or solutions that can be transferred beyond the knowledge used to solve the problem.”

Third, learning outcome of STEM integration in the descriptive framework (NRC, 2014) particularly emphasized the learning outcome of STEM integration. The framework suggested measurable outcomes in integrated STEM education could be individual STEM literacy and STEM identity. The framework pointed out “individual aspects of STEM literacy, for example, understanding of specific science or mathematics concept or awareness of how the STEM disciplines help shape our world, are measurable outcome” (NRC, 2014, p. 39), and “efforts to study outcomes related to STEM identity have focused on single subject rather than the broader concept of STEM” (NRC, 2014, p. 40). To apply this feature to lesson plan level, the two instructors changed the feature to Role of Learning Outcomes. As such, the two key points, STEM literacy and identity, from the descriptive framework (NRC, 2014) were combined into a working definition. The role of the learning outcomes was defined as “learning outcomes focus on interdisciplinary concepts and skills that are woven throughout when solving problems.”

Fourth, role of teachers of Vasquez and her colleagues’ (2013) framework pointed out the importance of teachers’ role in integrated STEM education. Vasquez and her colleagues (2013) defined the role of instruction in transdisciplinary (the highest level) as “set goals, facilitate student learning across disciplines, and invite students to help shape the learning experience” (p. 74). Other literature also emphasized the importance of teachers’ role in integrated STEM education. These
definitions were “[providing] a real-world problem or task centers on an authentic issue or meaningful challenge” (Bryan et al., 2016, p. 25), and “pedagogies for the instruction of the mathematics and/or science content need to be student-centered pedagogies” (Moore et al., 2014, p. 43). The language of this feature could be directly used to evaluate lesson plan level. Therefore, the two instructors did not change the language of this feature, but added the type of the instruction. By combining the key points from the current literature, the Role of Instructors, and Type of Instruction was defined as “the instructor is a facilitator and provides enough directions/guidelines to engage students to solve a problem. Students determined the direction of the task that needs to complete.”

After reviewing and unpacking current literature, authors, also as the instructors, identified two additional features: (5) Role of the AFNR content knowledge and (6) Role of students’ thinking that we considered are particularly important to integrating STEM through AFNR. As authors stated in the previous section, AFNR challenges are real-life challenges. Currently, literature has not provided enough information for authors to differentiate the level of real-life challenges in STEM integration. Therefore, the two new features, the Role of AFNR Content Knowledge and the Role of Students’ Thinking, helped the two instructors identify the presence and the purpose of using AFNR real-life challenges. The two instructors defined the highest level of the role of AFNR content knowledge as “AFNR serves as an integrator of STEM learning by focusing on a real-world problem that blends disciplines,” and the role of students’ thinking as “thinking is predominantly outside of the box with few to no boundaries that limit thinking. Students demonstrate systems thinking, critical thinking, creative thinking, and/or complex problem-solving.”

The two instructors classified the six features of the highest level of the integrated STEM through AFNR rubric from current literature and instructors’ expertise. However, when instructors communicated the highest level of STEM integration to students, students demonstrated that they had different interpretation of the six features. The integrated STEM through AFNR lesson plans that students developed showed variations in each feature. Based on the feedback from students, the two instructors used the framework of three approaches to design integrated STEM curriculum units (Vasquez, Sneider, & Comer, 2013) as a guideline to develop the three levels of the integrated STEM through AFNR rubric. The first, second, and third levels are Exploring, Developing, and Advancing STEM Integration through AFNR. All 27 lessons were coded using the rubric to validate the language and interpretation of the descriptive evidences of each level for each of the six features. In summary, Table 1 shows the six features and the description of each level of the six features of integrated STEM through AFNR rubric.
Table 1

Rubric of Levels of Integration and Features

<table>
<thead>
<tr>
<th>Levels of Integration</th>
<th>Exploring STEM Integration</th>
<th>Developing STEM Integration</th>
<th>Advancing STEM Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role of Integration in Learning Objectives</td>
<td>Learning objectives create awareness of STEM connections</td>
<td>Learning objectives develop STEM learning content/skills</td>
<td>Learning objectives apply STEM knowledge to solve problems</td>
</tr>
<tr>
<td>Role of the STEM Concepts, Content Knowledge, and Skills</td>
<td>Core disciplinary STEM concepts and skills are mentioned to point out the connections in different disciplines or one of the STEM disciplines is predominantly present.</td>
<td>Core disciplinary STEM concepts and skills are taught and/or practiced to bridge different disciplines or multiple STEM disciplines are distinctly present.</td>
<td>Core disciplinary STEM concepts and skills are considered as prior knowledge, and are naturally and meaningfully used/applied to solve problems or multiple STEM disciplines are difficult to distinguish as separate disciplines because they closely interdependent.</td>
</tr>
<tr>
<td>Presence</td>
<td>No strong evidence of using STEM content knowledge to solve problems. It is activity-driven. For example, the activity focuses on practicing engineering design process or problem solving, but no explicitly stated STEM content knowledge is needed to solve the problem.</td>
<td>Use of STEM content knowledge are explicitly taught to solve the problem. Content knowledge is fixed, students do not go beyond the knowledge as it exists in its disciplines.</td>
<td>Use of STEM content knowledge is used to analyze and interpret the problem. Content knowledge is integrated, synthesized or transformed into some kind of tools or solutions that can be transferred beyond the knowledge used to solve the problem.</td>
</tr>
<tr>
<td>Usage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role of Learning Outcomes</td>
<td>Learning outcomes merely focus on one discipline (one concept, and/or one skill).</td>
<td>Learning outcomes mainly focus on one discipline (one concept, and/or skill), but other disciplines are used to support the understanding of the core learning outcomes.</td>
<td>Learning outcomes focus on interdisciplinary concepts and skills that are woven throughout when solving problems.</td>
</tr>
</tbody>
</table>
Rubric of Levels of Integration and Features

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</tr>
</thead>
<tbody>
<tr>
<td>Role of the Instructor and Type of Instruction</td>
<td>The instructor merely gives directions or guidelines. Students follow “cook book” type of instruction to complete the task.</td>
<td>The instructor mainly gives directions or guidelines, but students have some freedom to determine the direction to complete the task in a controlled environment.</td>
<td>The instructor is a facilitator and provides enough directions/guidelines to engage students to solve a problem. Students determined the direction of the task that needs to complete.</td>
</tr>
<tr>
<td>Role of AFNR Content Knowledge</td>
<td>AFNR content is the primary focus of lesson.</td>
<td>AFNR provides a context for STEM learning or experiential learning process.</td>
<td>AFNR serves as an integrator of STEM learning by focusing on a real-world problem that blends disciplines.</td>
</tr>
<tr>
<td>Role of Students’ Thinking</td>
<td>Thinking merely stays inside of the box (the discipline, or the concepts/skills that need to be learned), but may see outside of the box upon completion of the problem-solving process.</td>
<td>Thinking is mainly inside of the box, but occasionally steps out the box to draw connections from other disciplines to solve the problem.</td>
<td>Thinking is predominantly outside of the box with few to no boundaries that limit thinking. Students demonstrate systems thinking, critical thinking, creative thinking, and/or complex problem-solving.</td>
</tr>
</tbody>
</table>

As we pointed out, the highest level of STEM integration through AFNR rubric was developed based on the current literature and the instructors’ expertise and praxis. In this section, we provided evidences for the first and second levels of STEM integration through AFNR from the students’ lesson plans.

Role of Integration in Learning Objectives. Some students’ integrated STEM through AFNR lesson plans focused their learning objectives on promoting awareness of STEM connection (Level 1). For example, in the lesson plans of Where’d You Get That?! By-products of Animals in Agricultural Settings, the overarching learning objective was “student understanding and knowledge through STEM-related activities by raising awareness of where by-products originate....” On the other hand, some of the learning objectives focused on developing STEM learning content and skills (Level 2). For example, in the lesson plans of the Buzz on Bees, the overarching learning objective was “students learn and apply key concepts and ideas about bee habitat and importance as it relates to agriculture and food production process.”

Role of STEM Concepts, Content Knowledge, and Skills—Presence. In the presence of STEM concepts, content knowledge, and skills, some integrated STEM through AFNR lesson plans
predominantly focused on one discipline (Level 1). For example, the second lesson plan of *Where’d You Get That?! By-products of Animals in Agricultural Settings* was about by-products of sheep. The lesson plan was designed for the preservice informal educators first reviewed 5 minutes of what students had learned from the previous lesson. Then, the preservice informal educators taught 10 minutes about how people sheared sheep to get wool, and how to spin wool into yarn. Then, the preservice informal educators spent 25 minutes to have students shave shaving cream off of a balloon using a craft stick. The balloon coated with shaving cream represented a sheep. Then, the preservice informal educators spent the last 5 minutes reviewing/asking students about the purpose of shearing a sheep, and usage of wool. On the other hand, some lesson plans focused on using STEM concepts and skills that were taught to bridge different disciplines (Level 2). For example, the second lesson plan of *The Great Forest Controversy*, the preservice informal educator first spent 5 minutes reviewing what students had learned in lesson one. Then, students did an activity about 40 minutes to explore how clear-cutting a forest affected different animals. Students studied animals’ life history traits and decided how these traits influenced its habitat preference (biology content). Then, students used a forest map to decide how the animal responded to the effects of clear-cutting on their habitat. During the last 5 minutes, the preservice informal educator helped students to reflect on what they learned.

**Role of STEM Concepts, Content Knowledge, and Skills—Usage.** In the usage of STEM concepts, content knowledge, and skills, some integrated STEM through AFNR lesson plans were activity-driven, or in some cases, predominantly focused on introducing and practicing engineering design process without any content (Level 1). For example, in the fourth lesson of *Food and Water System*, the preservice informal educators discussed the difference between point and nonpoint source of water pollution. However, students did not need to use the knowledge that they have learned to complete the activity, which was asking students to design a technology from assorted craft supplies, such as straws, craft sticks, rubber bands, and pipe cleaners, which were used to catch (clean) sediments in and floating objects on the water. On the other hand, some lessons that reflected the use of STEM content knowledge were explicitly taught to solve the problem, but students did not go beyond the knowledge as it exists in its disciplines (Level 2). For example, in lesson two of the *Science with Stella the Great and Bruno Uptown Funk Boss*, students first learned the six essential nutrients required for a healthy canine diet. Then, students mimicked the engineering design process to design their dog food recipes. Students analyzed and read the actual dog food labels as they were conducting their research before they designed their recipes. Students needed to include the six essential nutrients in their dog food recipes by thinking about what ingredients that they wanted to use. Finally, students tested their dog food recipes by presenting their recipes to people who have dogs to see if they would buy the dog food that they designed.

**Role of Learning Outcomes.** Some integrated STEM through AFNR lesson plans focused the learning outcomes as one discipline/concept/skill (Level 1). For example, the learning outcome for the *Operation Separation* lesson plans was if students could recall and use the 5-steps engineering design process to select correct tools to separate salt and pepper. On the other hand, some of the lesson plans focused the learning outcomes on using different disciplines to support the understanding of the core learning outcomes (Level 2). For example, the learning outcome for the *Happy Cows, Happy House* lesson plans was to use engineering design to evaluate if the cattle husbandry that students designed included all the essential components for cows to survive.

**Role of Instructor and Type of Instruction.** Some preservice informal educators focused their teaching by asking students to follow their instruction step by step (Level 1). In this type of teaching, the preservice informal educators gave detailed guidelines for students to follow to complete the activities. For example, when preservice informal educators taught the *Where’d You Get That?! By-products of Animals in Agricultural Settings* lesson plans, students followed detailed
step-by-step instructions. Students first put the wool into a bowl. Then, students chose what color to dye the wool. After that, students created clothing using the paper clothes as guides, and so on. For some lesson plans, the preservice informal educators gave more freedom for students to determine the direction to complete the task (Level 2). For example, in the lesson four of the Science with Stella the Great and Bruno Uptown Funk Boss, students needed to design and build an agility course for a dog. The preservice informal educators explained the materials that were provided to the students. Then, the preservice informal educators had students draw an agility course that they would like to build. After that, students used the materials that the preservice informal educators provided to build the course.

**Role of AFNR Content Knowledge.** Some integrated STEM through AFNR lesson plans used AFNR content as the primary focus of lesson (Level 1). The first lesson plan of Agriculture & Food was an example. In the lesson plan, agriculture was the only focus. On the other hand, some lesson plans used AFNR to provide context for STEM learning (Level 2). For example, both The Great Forest Controversy and Exploring Your Natural World used forestry to teach biological concept of animal traits.

**Role of Students’ Thinking.** In some of the integrated STEM through AFNR lesson plans, students learned and practiced certain concepts and skills (Level 1). The lesson plans did not require students to think critically to solve a problem. For example, the lesson plans from Where’d You Get That?! By-products of Animals in Agricultural Settings did not ask students to think critically to make their final products. Students followed a step-by-step process and created almost identical final products. On the other hand, some lessons demonstrated that students would think mainly inside of the box, but occasionally stepped out the box to draw connections from other disciplines to solve the problem. For example, Science with Stella the Great and Bruno Uptown Funk Boss, students needed to apply what they had learned about six essential nutrients, heredity and traits of different dogs, and the importance of dog health and fitness to design an agility course. In this mini-unit, students needed to use the knowledge that they learned and maybe draw some knowledge from their personal experiences to design the agility course.

For Research Question 2, 27 integrated lessons representing 10 mini-units were reviewed and categorized into levels of STEM integration for each feature using the rubric (see Table 2). For the Role of Integration in Learning Objectives, eight lessons (30%) were identified as Level 1, 16 lessons (59%) were identified as Level 2, and three lessons (11%) were identified as Level 3. For the Presence of the Role of the STEM Concepts, Content Knowledge, and Skill, 15 lessons (56%) were identified as Level 1, nine lessons (33%) were identified as Level 2, and three lessons (11%) were identified as Level 3. For the Usage of the Role of the STEM Concepts, Content Knowledge, and Skill, 10 lessons (37%) were identified as Level 1, 16 lessons (59%) were identified as Level 2, and one lesson (4%) was identified as Level 3. For the Role of the Learning Outcomes, 16 lessons (56%) were identified as Level 1, 10 lessons (41%) were identified as Level 2, and one lesson (4%) was identified as Level 3. For the Role of the Instructor and Type of the Instruction, 11 lessons (37%) were identified as Level 1, 15 lessons (59%) were identified as Level 2, and one lesson (4%) was identified as Level 3. For the Role of the AFNR Content Knowledge, 15 lessons (52%) were identified as Level 1, 11 lessons (44%) were identified as Level 2, and one lesson (4%) was identified as Level 3. For the Role of the Students’ Thinking, 17 lessons (59%) were identified as Level 1, nine lessons (37%) were identified as Level 2, and one lesson (4%) was identified as Level 3.

Table 2

**Table 2**

**Levels of STEM Integration for Lessons and Mini-Units**
<table>
<thead>
<tr>
<th>Mini-Unit</th>
<th>Lesson No.</th>
<th>Lesson Mean (SD)</th>
<th>Unit Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy Cow, Happy House</td>
<td>1</td>
<td>2.0 (.00)</td>
<td>2.0 (.00)</td>
</tr>
<tr>
<td>The Buzz on Bee</td>
<td>1</td>
<td>1.3 (.45)</td>
<td></td>
</tr>
<tr>
<td>The Buzz on Bee</td>
<td>2</td>
<td>1.6 (.49)</td>
<td>1.4 (.47)</td>
</tr>
<tr>
<td>Operation Separation</td>
<td>1</td>
<td>1.4 (.49)</td>
<td>1.4 (.49)</td>
</tr>
<tr>
<td>The Great Forest</td>
<td>1</td>
<td>2.0 (.00)</td>
<td></td>
</tr>
<tr>
<td>The Great Forest</td>
<td>2</td>
<td>2.0 (.00)</td>
<td>2.3 (.00)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3.0 (.00)</td>
<td></td>
</tr>
<tr>
<td>By-product Animals</td>
<td>1</td>
<td>1.3 (.47)</td>
<td></td>
</tr>
<tr>
<td>By-product Animals</td>
<td>2</td>
<td>1.0 (.00)</td>
<td>1.1 (.12)</td>
</tr>
<tr>
<td>By-product Animals</td>
<td>3</td>
<td>1.0 (.00)</td>
<td></td>
</tr>
<tr>
<td>By-product Animals</td>
<td>4</td>
<td>1.0 (.00)</td>
<td></td>
</tr>
<tr>
<td>Exploring Natural World</td>
<td>1</td>
<td>2.0 (.00)</td>
<td>2.0 (.00)</td>
</tr>
<tr>
<td>Exploring Natural World</td>
<td>2</td>
<td>2.0 (.00)</td>
<td></td>
</tr>
<tr>
<td>Food &amp; Water Cycle</td>
<td>1</td>
<td>1.3 (.47)</td>
<td></td>
</tr>
<tr>
<td>Food &amp; Water Cycle</td>
<td>2</td>
<td>1.2 (.37)</td>
<td>1.1 (.21)</td>
</tr>
<tr>
<td>Food &amp; Water Cycle</td>
<td>3</td>
<td>1.0 (.00)</td>
<td></td>
</tr>
<tr>
<td>Food &amp; Water Cycle</td>
<td>4</td>
<td>1.0 (.00)</td>
<td></td>
</tr>
<tr>
<td>Agriculture &amp; Food</td>
<td>1</td>
<td>1.0 (.00)</td>
<td>1.5 (.00)</td>
</tr>
<tr>
<td>Agriculture &amp; Food</td>
<td>2</td>
<td>2.0 (.00)</td>
<td></td>
</tr>
<tr>
<td>Health Food &amp; Life</td>
<td>1</td>
<td>1.3 (.45)</td>
<td></td>
</tr>
<tr>
<td>Health Food &amp; Life</td>
<td>2</td>
<td>1.4 (.49)</td>
<td>1.6 (.48)</td>
</tr>
<tr>
<td>Health Food &amp; Life</td>
<td>3</td>
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</tr>
<tr>
<td>Health Food &amp; Life</td>
<td>4</td>
<td>2.3 (.47)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 (continued)

*Levels of STEM Integration for Lessons and Mini-Units*
Overall, lessons were developed to help students *explore* and *develop* STEM integration through AFNR. The overall mean of the 10 sample mini-units represented by 27 lesson plans was 1.6 ($SD = .20$; Table 2). We noticed a difference in levels of integration based students’ previous experiences with formal and nonformal/informal teaching experiences. Integrated lesson plans developed by preservice educators with previous teaching experiences in non-formal and informal settings were at a higher level of integration ($M = 1.65$) compared to their peers who had previous teaching experiences in formal education setting ($M = 1.18$). Students who had no previous teaching experiences developed integrated STEM lessons at a level similar to their peers who had nonformal or informal teaching experiences ($M = 1.58$).

Mini-units that had more than two lesson plans provided scaffolding to help students learn STEM knowledge in the first lessons and then apply STEM knowledge and skills to solve a problem in the later lessons. As such, the first lesson plan always had the lowest score, but the last lesson plan had the highest score. These mini-units were *Agriculture & Food; Buzz on Bees; Exploring Your Natural World; Healthy Food, Healthy Life; Science with Stella the Great and Bruno Uptown Funk Boss;* and, *The Great Forest Controversy* (see Table 2). Only one mini-unit’s last lesson plan, *The Great Forest Controversy: Animals Stuck between Media, Science, and Management*, reached Level 3 in each feature of integrated STEM through AFNR rubric.

**Conclusions & Implications**

The research study further expanded the knowledge base by expanding a framework to identify levels and features of integrated STEM using AFNR as a context in four ways. First, three levels were identified to provide more accessible language understand there is a continuum of integrating STEM through AFNR. For example, preservice informal educators developed lessons that helped their students explore (Level 1), develop (Level 2), or advance (Level 3) integrated STEM learning through AFNR. Although Vasquez and her colleagues (2013) developed three approaches, multidisciplinary, interdisciplinary and transdisciplinary learning, to design integrated STEM curriculum units, preservice informal educators found the languages were ambiguous and unclear when they attempted to use the approaches to plan their lessons to represent the different levels of integration. This findings support that teachers may not have the knowledge to effectively teach STEM (Baker, Bunch, & Kelsey, 2015) or clarity in how to teach STEM integratively (Breimer, Harkness, Johnson, & Koehler, 2012). As such, the rubric can be used by teacher educators to help dissect the structure of integrated STEM lesson plans and unpack students’ conceptions of integrated STEM. Moreover, the rubric can be used to evaluate more specific features and evidences of integrated STEM learning across the three levels.
Second, preservice informal educators developed lessons that reached Level 2 for three features, *Role of Integration in Learning Objectives; STEM Concepts, Content Knowledge, and Skills—Usage*; and *Role of Instructor and Type of Instruction*, but their lessons reflected Level 1 integration regarding the other four features, *STEM Concepts, Content Knowledge, and Skills—Presence; Role of Learning Outcomes; Role of AFNR Content Knowledge; and Role of Students’ Thinking*. This indicates the preservice informal educators’ integrated STEM through AFNR lesson plans focused on teaching STEM content and skills, and wanting students to directly use the content and skills that are taught to solve the problem. The lesson plans did not go beyond teaching and using AFNR content and skills. These Level 1 lessons could potentially move to Level 2 with some modifications and more focus on role of how STEM and AFNR content worked together in solving the real-world problem by helping students think outside of boxes. Teacher educators may use the rubric to more accurately evaluate integrated STEM lesson plans and hopefully have more meaningful conversations and reflections about integrated STEM learning experiences, especially regarding the presence of STEM concepts, content knowledge and skills, role of learning outcomes, role of AFNR content knowledge, and role of students’ thinking.

Third, preservice informal educators’ integrated STEM through AFNR lesson plans attempted to achieve the goal, to some degree, of using real-world problems to connect students’ learning and use the content knowledge and skills to solve the problem (Bryan et al., 2016; NRC 2014). This conclusion supports current literature that real-world problems are used to support integrated STEM learning (Bryan et al., 2016), but the authenticity, complexity, and structure of the real-world problem can lead to different approaches of integrated STEM learning. For example, we used two lesson plans from *The Great Forest Controversy* and *Science with Stella the Great and Bruno Uptown Funk Boss* as examples to provide suggestions on how to connect not only AFNR content and skills but also to other disciplines. Among the 27 lesson plans, only one lesson plan, *The Great Forest Controversy: Animals Stuck Between Media, Science, and Management*, reached Level 3 in all features. The lesson plan was the last lesson plan in a mini-unit. The lesson plan engaged students to evaluate and analyze the actual data about clear-cutting that were collected by a group of researchers. Students needed to apply the knowledge that they learned from the previous lesson plans (lesson one and lesson two) to propose and justify appropriate management techniques, and explain the process that they used to develop an appropriate management plan in a boardroom activity. As for the *Science with Stella the Great and Bruno Uptown Funk Boss: Ag Fitness Dog Gym*, although the lesson plan reaches Level 3 of the *Role of integration in learning objectives*, the rest of features were at Level 2. The lesson plan also was the last lesson plan in a mini-unit, and it had an intention to connect students to use what they learned to solve a problem. The lesson plan was structured by having the students design an agility course for the dogs to run through, and the students have to use what they have taught in prior lessons (lesson one to lesson three) to design the agility course. Compared the two mini-units, *The Great Forest Controversy* asked students to evaluate and analyze the actual data that were collected from scientists to critically think the real-world challenge. Students needed to use content knowledge and skills from other disciplinary, such as math and science, to solve the problem. However, the real-world challenge in the *Science with Stella the Great and Bruno Uptown Funk Boss* either explicitly helped students connect other disciplinary content and skills, or went beyond to use their imagination when they tried to design the agility course for the dogs. To us, one is a real-world problem, but the other one is a problem that tried to mimic real-world problem. The design problem that *The Great Forest Controversy* used meaningfully integrated agriculture, science and math, but the design problem that *Science with Stella the Great and Bruno Uptown Funk Boss* used seemed lack of that effort. The rubric may help teachers focus, frame, and scaffold real-world problems to help their students apply STEM concepts, content knowledge, and skills in meaningful ways so students can see how STEM was applied to solve the AFNR-related problem integratively (Breiner, Harkness, Johnson, & Koehler, 2012).
Finally, preservice informal educators who had previous teaching experience in nonformal or informal education achieved higher scores of integrated STEM through AFNR lessons than those who had formal teacher education training and previous teaching experience in formal classrooms. One assumption was because the integrated STEM through AFNR lesson plans that the preservice informal educators developed were for afterschool programs. Therefore, individuals who had teaching experiences in non-formal educational settings were advantaged to develop the lesson plans for afterschool programs. Another assumption is because formal teacher education training is more structured and focused on specific content standards. Individuals who received formal teacher education training more likely encountered challenges to consolidate the information that they learned in the course about integrated STEM through AFNR because it was different than the previous lesson planning instruction they learning in a formal teacher preparation program. Teacher educators should acknowledge the philosophical assumptions and differences in instructional practices of integrated STEM learning than what preservice educators may have been previously taught in formal teacher education courses.

Although teaching of science and math by using engineering design practices is most commonly discussed in the literature (Bryan et al., 2016; Moore et al., 2014; NGSS, 2013; NRC 2014; Wang, Moore, Roehrig, & Park, 2011), STEM integration in the agricultural education literature has received limited attention (e.g., Stubbs & Myers, 2016). However, AFNR certainly aligned with existing features of integrated STEM, and AFNR educators and communities undoubtedly have potential to prepare people to solve complex interdisciplinary problems (Andenoro, Baker, Stedman, & Weeks, 2016), which is one of the major goals of STEM integration regardless if it has been discussed in the science or engineering education (Bryan et al., 2016; Moore et al., 2014; NGSS, 2013; NRC 2014). Through a review of STEM integration framework, and unpacking of the integrated STEM through AFNR lesson plans that were developed by preservice informal educators, the study addressed the gap of absent a tool/rubric that provides practical guidance for researchers and educators to design and evaluate integrated STEM through AFNR lessons. The three levels of the six features of integrated STEM through AFNR rubric served as a practical and effective tool for the instructors to evaluate integrated STEM through AFNR lesson plans and to communicate and articulate the criteria about the level of integrated STEM through AFNR lesson plans. By using the three level of the six features of integrated STEM through AFNR rubric to investigate the integrated STEM through AFNR lesson plans that the preservice informal educators developed, the two instructors had a better understanding about what integrated STEM through AFNR meant to preservice informal educators, and were able to point out specific features that the preservice informal educators can be improved in their lesson plan design.

Recommendations for Further Research

The rubric may provide practical guidance for researchers and educators to design and evaluate integrated STEM through AFNR lessons. Although Level 3 is the highest level of integration, the authors do not infer that all lesson plans in a mini-unit need to achieve Level 3 in all the six features to be the most effective integrated learning experience. In fact, we argue two key points. First, we question the extent an integrated STEM through AFNR mini-unit can have all the lesson plans that achieve Level 3 for all six features. Second, integrated STEM through AFNR lessons or mini-units could be different combinations of levels for each feature and still be effective. More research is need in this area to better unpack and understand effective integrated STEM learning experiences through AFNR, especially more work should focus on better understanding how to focus, frame and scaffold real-world problems that would facilitate effective integrated STEM learning experiences. Moreover, although potential biases were monitored, the potential biases of two instructors as researchers may have influenced the results. As such, we suggest more educational researchers use the rubric to determine its validity in multiple contexts, including other
contextualized applications of STEM (e.g., medical, transportation), educational settings (i.e., formal & informal), and grade levels. Although the lessons were developed and tested with upper-level elementary students, the rubric should be tested for age-appropriateness across K-12 audiences. Further, the number of lesson plans is a limitation of the study. It is possible that the 27 lessons of integrated STEM through AFNR did not represent all the possibilities of examples of STEM integration through AFNR. Therefore, the rubric might be tailored to evaluate a certain type of integrated STEM through AFNR. More lesson plans need to be examined to ensure the rubric has external validity. The research study may have been limited by the approach and strategies used in the course. Therefore, the rubric should be studied in different courses and approaches, such as teaching preservice and in-service agriculture and/or STEM teachers to develop integrated STEM lessons. Finally, future research studies should triangulate data sources to include observations of integrated STEM lessons and student outcomes of lessons. This would further validate the utility and empirical evidence of teaching STEM through AFNR.

References


A Description of the Professional Identities of Arkansas Agriculture Teachers

Catherine W. Shoulders

Abstract

After decades of research in agricultural education on teacher knowledge, needs, behaviors, satisfaction, and attrition, calls for additional research and reform have remained fairly consistent. One potential factor influencing the rate at which these challenges are overcome is teacher professional identity, which shapes how teachers interpret and respond to knowledge delivered through professional development. Shoulders and Myers (2011) suggested the unique circumstances of agricultural education lead teachers to maintain a professional identity different than that of other educators, but little research has been conducted with regard to the professional identities of agriculture teachers. Using the theories of constructivism and planned behavior, this study utilized a researcher-adapted survey to describe the professional identities of Arkansas agriculture teachers. Findings indicated teachers identified as agriculture teachers more so than agriculturalists or educators, the professional identity of the agricultural educator was significantly different than that of the educator or the agriculturalist, and length of teaching experience was not related to professional identity score. We recommend teacher educators include the development of professional identity as a component of all professional development experiences. Recommendations for further research include qualitative investigation into the ways in which agriculture teachers’ professional identities manifest in the agriculture program.

Keywords: professional identity, agriculture teachers, professional development

Introduction

Just as is the case within any profession, continuous improvement is a common thread among all those working within agricultural education. Agriculture teachers work to improve their knowledge in subject matter expertise and pedagogical content in an effort to improve student success (Barrick & Garton, 2010; National Research Council, 2010; Rice & Kitchel, 2017). Administrators offer opportunities and resources for agriculture teachers to attend professional development events and foster collaborations that can help them gain the tools needed to positively impact student learning while maintaining successful careers (Anderson, Barrick, & Hughes, 1992). Agricultural educators within postsecondary institutions frequently create professional development events and examine methods through which they can maximize the impact these events can have on teachers’ behaviors in the classroom (Anderson et al., 1992). However, after decades of research on teacher knowledge, needs, behaviors, satisfaction, and attrition, calls for additional research and reform have remained fairly consistent. The profession has been facing a shortage of qualified teachers since the 1960s (Camp, 2000), with the most recent supply and demand report stating a national shortage leading to 769.5 open agricultural education teaching positions (Smith, Lawver, & Foster, 2017). The integration of science, technology, engineering, and math (STEM) into agriculture classes was announced as a high priority by the National Research Council in 1998, and continued to receive print space within the American Association

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for Agricultural Education’s National Research Agenda for 2016 through 2020 within its priority for efficient and effective agricultural education programs (Thoron, Myers, & Barrick, 2016). Research on teaching methods, such as inquiry based instruction (Blythe, DiBenedetto, & Myers, 2015; Myers, Thoron, & Thompson, 2009; Parr & Edwards, 2004), and on professional development opportunities, such as the National Agriscience Teacher Ambassadors Academy (Blythe et al., 2015; Myers et al., 2009) and CASE (Ulmer, Velez, Lambert, Thompson, Burris, & Witt, 2013; Witt, Ulmer, Brashears, & Burley, 2014), have continued as the call for STEM integration has been echoed by researchers and educators throughout the decades. The collective voice appears to put forth one resounding message: we are improving, but there is more to be done.

Professional development opportunities are offered by individual K-12 school districts, university agricultural educators and scientists, professional organizations, and technical specialists within agricultural companies. These events can focus on technical content or pedagogical content, all with the common goal of improving the teaching and learning occurring within K-12 agriculture classrooms. While not all professional development events are created to intentionally align with data-supported professional development characteristics, theories are available to assist deliverers in ensuring the impact of their event.

Richardson (1996) noted that effective constructivist professional development programs include the following six characteristics:

1. The participating teachers’ beliefs and understandings are a major element of the content of the staff development process.
2. The goal of the process is not to introduce a specific method or curriculum to be implemented by the teachers. Instead the goal is to facilitate conversations that allow the participants to understand their own beliefs and practices, consider alternatives, and experiment with new beliefs and practices.
3. Conversations about beliefs and practices are brought together with considerations of the moral dimensions of teaching and schooling.
4. During the course of the process, the discussions among staff developer and teachers move away from the domination by the staff developer toward teacher control of the agenda, process, and content.
5. The staff developer is knowledgeable about the current research and practice; however, he or she is not seen as the only “expert”. A collaborative process is facilitated that allows the teachers to recognize and value their own expertise.
6. The staff development process is long term, and it is expected that teachers change at very different rates. (p. 113)

Congruently, Desimone (2011) stated research supports the five following characteristics as necessary for effective professional development:

1. Content focus: Professional development activities should focus on subject matter content and how students learn that content.
2. Active learning: Teachers should have opportunities to get involved, such as observing and receiving feedback, analyzing student work, or making presentations, as opposed to passively sitting through lectures.
3. Coherence: What teachers learn in any professional development activity should be consistent with other professional development, with their knowledge and beliefs, and with school, district, and state reforms and policies.
4. Duration: Professional development activities should be spread over a semester and should include 20 hours or more of contact time.
5. Collective participation: Groups of teachers from the same grade, subject, or school should participate in professional development activities together to build an interactive learning community. (p. 69)

Within both of these lists is the notion that the teacher’s previous beliefs and values are taken into consideration within the professional development. Beliefs and values, along with individual and social factors such as background characteristics and socially established attitudes in specific contexts, make up one’s professional identity (Simonneaus, 2000). It is through their professional identity that teachers interpret and decide how to act upon knowledge learned in professional development (Desimone, 2011). Shoulders and Myers (2011) suggested the unique circumstances of agricultural education lead teachers to maintain a professional identity different than that of other educators. Because professional identity is displayed within social contexts pertaining to the profession, it can influence teachers’ receptiveness to and motivation to adopt behaviors promoted within professional development (Desimone, 2011; Shoulders & Myers, 2011). Therefore, the professional identity of agriculture teachers could interact with their professional development experiences, particularly within Desimone’s (2011) listed realms of coherence and collective participation. Shoulders and Myers (2011) identified agriculture teacher professional identity as “an unexplored area that holds potential solutions to increasing changes in teacher behavior” (p. 106), and recommended researchers investigate the role professional identity plays within agricultural education and teacher professional development. This study responds to their call by examining the professional identities of agriculture teachers in Arkansas.

Theoretical and Conceptual Frameworks

This study was guided by the theories of constructivism and planned behavior (Ajzen, 1991). Constructivism is founded on the premise that knowledge is developed alongside experience, and the two cannot be separated (Keiny, 1994). Because knowledge is only known through experience, teachers in professional development knit an unending tapestry of understanding that combines their previous experiences and knowledge with the information delivered through the current professional development.

Within the theory of planned behavior, the constructivist notion of knowledge development is woven within an individual’s attitude toward a behavior, the subjective norm regarding the behavior, and the individual’s perceived control over the behavior. A teachers’ attitude toward a behavior is influenced by his or her previous knowledge and experience, combined with the shared knowledge developed through social experiences (including previous professional development) (Doolittle & Camp, 1999). Professional identities are created through these social experiences, and are therefore also displayed in the settings shared by these individuals (Shoulders & Myers, 2011). This study was guided by the notion that professional identities influence the professional development experiences of teachers, thereby impacting their behavioral intentions.

Teachers make professional decisions, such as those within instruction, classroom management, and teacher collaboration, through the identity that they develop within the social and internal contexts of their discipline, school, and background characteristics (Peressini, Borko, Romagnano, Knuth, & Willis, 2004; Simonneaus, 2000). Established features of professional identity include the following:

1. Professional identity is an ongoing process of interpretation and re-interpretation of experiences;
2. Professional identity implies both person and context. A teacher’s professional identity is not entirely unique.
3. A teacher’s professional identity consists of sub-identities that more or less harmonize. The notion of sub-identities relates to teachers’ different contexts and relationships. The more central a sub-identity is, the more costly it is to change or lose that identity.

4. Agency is an important element of professional identity, meaning that teachers have to be active in the process of professional development. (Beijaard, Meijer, & Verloop, 2004, p. 122)

Shoulders and Myers (2011) compiled research identifying several characteristics of agriculture teachers that could cause them to develop a professional identity different than that of other teachers, leading them to experience professional development differently as well. They noted that agriculture teachers often enter the profession out of a love for and previous experience within the agriculture industry, whereas other teachers enter the profession with little experience within an industry directly related to their discipline. The traditionally male-dominated nature of agricultural education can also cause separation between the professional identity of agriculture teachers and other teachers, as other educational contexts have employed female teachers more frequently. Also potentially contributing to a unique professional identity among agriculture teachers are the conflict between previously developed core sub-identities related to production-oriented agriculture challenged by educational reform focused on STEM integration and modern agriculture. Differences in teaching methods and agricultural education’s unique pride in delivering “hands on learning” and rooted societal beliefs about the values and practices of the agricultural education program can also further the divide between the identities of agriculture teachers and other teachers (Shoulders & Myers, 2011).

While professional identity has remained a little-explored topic within agricultural education, researchers have focused on teacher professional identity within other contexts. Conducting a qualitative analysis of student teacher portfolios, Antonek, McCormick, and Donato (1997) found that the reflection occurring through the portfolio guided the development of two foreign language preservice teachers’ professional identities. In 1994, Goodson and Cole analyzed the life history interviews of seven teachers, concluding that teachers’ development of professional identity depends on their notions of the professional community in which they work, and therefore, institutions should facilitate teachers’ personal and professional development. Beijaard, Verloop, and Vermunt (2000) administered a survey to 80 secondary school teachers to describe teachers’ perceptions of how their professional identities are formed. They concluded that teachers perceive their professional identities differently from one another based on the discipline in which they taught, teachers’ professional identities had changed from when they were beginning teachers, and professional identity changes were dependent on the subject area in which the teachers were employed. Supporting Desimone’s (2011) and Richardson’s (1996) recommendations, Pennington and Richards (2016) concluded language teacher education should address teacher identity to guide language educators in the development of their professional identities as they construct knowledge to ensure the two are congruent with one another.

The established differences between agriculture teachers and teachers of other subjects led to Shoulders and Myers’ (2011) call for research investigating agriculture teachers’ professional identities. Professional development is viewed through the identities of teachers, and these events are frequently delivered to groups of teachers representing a variety of disciplines. Knowledge regarding the professional identity of agriculture teachers, and how it may differ from those of other teachers, could provide professional development deliverers information necessary to maximize behavioral change following professional development, allowing these efforts to lead to greater impact on long-standing calls for educational change.
Purpose and Objectives

The purpose of this study was to determine the professional identities of Arkansas agriculture teachers. To meet this purpose, the following objectives were created:

1. to describe Arkansas agriculture teachers’ professional identities as educators, agriculturalists, and agricultural educators;
2. to determine the difference between teachers’ professional identities as educators, agriculturalists, and agricultural educators; and
3. to describe the correlation between length of teaching experience and professional identity.

Methods

This study utilized a descriptive design to meet the aforementioned objectives. Agriculture teachers employed in Arkansas were recruited to complete a researcher-adapted survey to examine their professional identities. Details regarding the design and methods of the study are provided below.

Instrument

We developed a questionnaire, referred to here as the Professional Identity Scale in Agricultural Education (PISAE), through the adaptation of Woo’s (2013) Professional Identity Scale in Counseling (PISC). The 54-item PISC evaluates the professional identities of counselors based on six sub-constructs, which were developed through a literature review: Engagement Behaviors (14 items), Knowledge of the Profession (11 items), Professional Roles and Expertise (nine items), Attitude (nine items), Philosophy of the Profession (seven items), and Professional Values (four items). The instrument utilizes a subject-centered scale to “reflect differences among the subjects in terms of their standing along the scale’s dimension” (Dawis, 1987, p. 481). Respondents indicate their agreement to items on the PISC using a six-point Likert-type scale, with anchors at the ends (not at all in agreement and totally in agreement) and the midpoint (neutral/uncertain). Internal consistency calculations on the original instrument yielded Cronbach’s alpha scores above 0.7 on all sub-constructs, with the exception of Professional Values (α = 0.44). Convergent validity was established by comparing scores with the Professional Identity and Values Scale (Healey, 2009), yielding moderate and high positive correlations within each of the sub-constructs (Woo, 2013). Divergent validity was established by comparing scores with the Marlowe-Crowne (20) (Strahan & Gerbasi, 1972), an instrument designed to “detect socially desirable response distortions” (Woo, 2013, p. 56). Resulting low and nonsignificant correlations with between the two scales indicated the PISC was resistant to the risk of respondents answering items in a socially desirable manner.

For this study, the PISC (referred to herein as the PISAE to reflect adaptations) was altered to measure respondents’ professional identities as educators, agriculturalists, and agricultural educators (PISAE). Within the electronic survey, respondents were asked to indicate their agreement with each item three times, one for each of the aforementioned professional identities (see Figure 1).
Reference to counseling or counselors was replaced with the term “profession” so teachers could respond to the item for the three separate professional identities (see Figure 1). While some items did not require any adaptation (for example, “I engage in certification/licensure renewal processes”), others included terms requiring adaptation (for example, in the item “I know the origins of the counseling profession,” the term “counseling” was removed). In order to enhance face validity of the PISAE, a drop-down, 5-point Likert-type scale was used for each question, allowing participants to respond quickly to an item for all three identities on one screen.

Three cognitive interviews were conducted with former agriculture teachers, two being researchers within agricultural teacher education, with differing lengths of teaching experience to ensure face and content validity. A pilot test including the Spring 2017 preservice teachers entering their final semester at the University of Arkansas (N = 7) was conducted to evaluate the PISAE’s internal consistency within each sub-construct for each professional identity (see Table 1). Scores indicated all sub-constructs were reliable.
Table 1.

Pilot Test Cronbach’s α Scores for Each Sub-construct and Professional Identity

<table>
<thead>
<tr>
<th>Sub-construct and Professional Identity</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of the Profession</td>
<td></td>
</tr>
<tr>
<td>Educator</td>
<td>0.788</td>
</tr>
<tr>
<td>Agriculturalist</td>
<td>0.979</td>
</tr>
<tr>
<td>Agricultural Educator</td>
<td>0.989</td>
</tr>
<tr>
<td>Philosophy of the Profession</td>
<td></td>
</tr>
<tr>
<td>Educator</td>
<td>0.649</td>
</tr>
<tr>
<td>Agriculturalist</td>
<td>1.000</td>
</tr>
<tr>
<td>Agricultural Educator</td>
<td>1.000</td>
</tr>
<tr>
<td>Professional Roles and Expertise</td>
<td></td>
</tr>
<tr>
<td>Educator</td>
<td>0.724</td>
</tr>
<tr>
<td>Agriculturalist</td>
<td>1.000</td>
</tr>
<tr>
<td>Agricultural Educator</td>
<td>0.971</td>
</tr>
<tr>
<td>Attitude</td>
<td></td>
</tr>
<tr>
<td>Educator</td>
<td>0.855</td>
</tr>
<tr>
<td>Agriculturalist</td>
<td>1.000</td>
</tr>
<tr>
<td>Agricultural Educator</td>
<td>0.994</td>
</tr>
<tr>
<td>Engagement Behaviors</td>
<td></td>
</tr>
<tr>
<td>Educator</td>
<td>0.783</td>
</tr>
<tr>
<td>Agriculturalist</td>
<td>1.000</td>
</tr>
<tr>
<td>Agricultural Educator</td>
<td>1.000</td>
</tr>
<tr>
<td>Interaction</td>
<td></td>
</tr>
<tr>
<td>Educator</td>
<td>0.686</td>
</tr>
<tr>
<td>Agriculturalist</td>
<td>1.000</td>
</tr>
<tr>
<td>Agricultural Educator</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Participants

The population for this study included all school based agriculture teachers employed in Arkansas (N = 227). The electronic instrument was sent via an emailed invitation and link distributed through the Arkansas agricultural education listserv. Reminders were sent once per week for one month. A total of 72 responses were received, yielding a 31.7% response rate. In order to control for nonresponse error, we performed demographic comparisons (including gender, length of teaching experience, and geographical region of employment) between respondents and nonrespondents (Lindner, Murphy, & Briers, 2001; Miller & Smith, 1983). Fifty-three respondents
were male, while 19 were female. A chi-square goodness of fit test was conducted to determine whether gender proportions among respondents were representative of the population. The minimum expected frequency was 18. The chi-square goodness of fit test indicated that the two genders were similarly distributed in the respondents as in the general population ($\chi^2(1) = .07, p = .79$). A one-sample $t$-test was run to determine whether length of teaching experience in the respondents was different from that in the population. There were no outliers in the data, as assessed by inspection of a boxplot. Mean number of years teaching in the sample ($M = 15.39, SD = 10.92$) was not significantly different than in the population, $t(64) = 1.09, p = .28$. Of the 72 respondents, 23 taught in the Eastern District, 30 taught in the Northwest District, and 19 taught in the Southern District. A chi-square goodness of fit test was conducted to determine whether respondents taught in districts at the same proportion as those in the general population. The minimum expected frequency was 19.6. The test indicated that the teaching districts were similarly distributed among respondents as in the population ($\chi^2(2) = .34, p = .84$). Because no demographic differences were found between respondents and nonrespondents, we determined findings were generalizable to the population.

**Data Analysis**

Data was collected using Qualtrics and analyzed in SPSS v.23. To meet Objective 1, descriptive statistics including means and standard deviations were used. Additionally, frequencies were used to describe teachers’ primary professional identities. Objective 2 was met via a one-way repeated measures ANOVA. Objective 3 was met via Pearson’s correlations.

**Findings**

Objective 1 sought to describe Arkansas agriculture teachers’ professional identities as educators, agriculturalists, and agricultural educators. Table 2 displays means and standard deviations for each sub-construct for each professional identity, as well as the total mean scores for each professional identity. Because not all respondents completed each section of the instrument, the number of respondents for each section is also included.

Table 2.

*Respondents’ Mean Scores for Each Sub-Construct for each Professional Identity*

<table>
<thead>
<tr>
<th></th>
<th>Educator Professional Identity</th>
<th>Agriculturalist Professional Identity</th>
<th>Agricultural Educator Professional Identity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Knowledge</td>
<td>64</td>
<td>27.86</td>
<td>4.50</td>
</tr>
<tr>
<td>Philosophy</td>
<td>62</td>
<td>16.84</td>
<td>2.15</td>
</tr>
<tr>
<td>Roles</td>
<td>56</td>
<td>25.66</td>
<td>3.38</td>
</tr>
<tr>
<td>Attitude</td>
<td>54</td>
<td>45.52</td>
<td>4.92</td>
</tr>
<tr>
<td>Engagement</td>
<td>52</td>
<td>38.12</td>
<td>6.48</td>
</tr>
<tr>
<td>Interaction</td>
<td>47</td>
<td>24.85</td>
<td>5.24</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>177.88</td>
<td>20.38</td>
</tr>
</tbody>
</table>
Respondents displayed the highest mean score for the agricultural educator professional identity and the lowest mean score for the educator professional identity. With the exception of Attitude, the agricultural educator identity received the highest mean scores in each sub-construct as well. The agriculturalist identity yielded a mean score of just 0.09 points higher than the agricultural educator identity in the Attitude sub-construct. It should be noted that respondents also completed the agricultural educator questions most frequently.

Because the original instrument was developed to determine the professional identity of counselors via total score, with higher scores aligning with a more developed professional identity, teachers’ primary professional identities were determined by identifying each respondent’s highest scoring identity. Questions not completed were given a score of 0, as we assumed nonresponse was the result of teachers not identifying with that identity enough to be motivated to complete the questions within. Those with equal scores for more than one identity were counted in all categories in which they yielded top scores; therefore the number of primary professional identities is higher than 72. The majority of teachers identified as agricultural educators (n = 64). Eighteen respondents identified as agriculturalists, while seven identified as educators.

Finally, teachers were asked to list the career they would pursue if they were not currently employed in agricultural education. Responses were coded by the researcher into three categories: education-related, agriculture-related, and other. Forty-eight teachers responded to this survey item; 40 indicated they would pursue an agriculture-related career, while six indicated they would pursue employment outside of both agriculture and education. Only two respondents indicated they would continue teaching in a discipline other than agriculture.

Objective 2 sought to determine the difference between teachers’ professional identities as educators, agriculturalists, and agricultural educators. A one-way repeated measures ANOVA was employed. Outliers were removed, leading to an n of 49. Professional identity was normally distributed for each profession, as assessed by a Shapiro-Wilk’s test (p > .05). Mauchly’s test of sphericity indicated that the assumption of sphericity had been violated, x^2(2) = .72, p = .001. Therefore, a Huynh-Feldt correction was used. Epsilon was .81. Professional identity was statistically different for the three professions, F(1.61, 77.34) = 32.77, p = .0005, n^2 = .41. Teachers identified significantly more as agriculturalists (M = 186.06) than as educators (M = 177.88). The mean difference was 8.18 (95% confidence interval, 3.17 to 13.20), p = <.005. Teachers’ agricultural educator identities were 14.80 +/- 2.09 points higher than their educator identities (95% confidence interval, 9.61 to 19.99), a statistically significant difference, p = < .0005. Their agricultural educator identities were also significantly higher than their agriculturalist identities, displaying a mean difference of 6.61 points (95% confidence interval, 3.45 to 9.75).

Objective 3 sought to describe the correlation between length of teaching experience and professional identity. Pearson’s correlation data was linear with no outliers, as was determined by a scatter plot. All variables were normally distributed, as assessed by a Shapiro-Wilk’s test (p > .05). No significant correlations were found between number of years teaching agriculture or any other subject and any of the professional identities.

**Conclusions, Implications, and Recommendations**

This study described the educator, agriculturalist, and agricultural educator professional identities of Arkansas agriculture teachers. Findings indicated the professional identity of the agriculture teacher is different than that of the educator or the agriculturalist. Agriculture teachers in Arkansas identified as agriculture teachers moreso than they did the other two professions. The significant differences found between teachers’ mean scores for each of the professional identities...
supports Shoulders and Myers’ (2011) position that agriculture teachers develop and maintain professional identities that are different from those of other educators. These findings also support research identifying educational discipline as a factor influencing professional identity (Beijaard et al., 2000; Peressini et al., 2004; Simonneaux, 2000), and extends those conclusions to include agricultural education. Because of the valuable role professional identity plays in teachers’ interpretations of professional development experiences, we recommend teacher educators plan professional development in a way that facilitates the acknowledgement of differing professional identities within groups of teachers from diverse disciplines. This recommendation follows similar calls made in other disciplines (Goodson & Cole, 1994; Pennington & Richards, 2016). Further, in professional development events planned specifically for agriculture teachers, teacher educators should assist teachers in understanding how the knowledge delivered aligns with their own professional identities as agriculture teachers, as well as how they can frame that knowledge to be accepted by teachers and administrators within their own schools. Desimone (2011), Beijaard et al. (2004), and Richardson (1996) each offered guiding characteristics of professional development and professional identity that can assist those planning professional development in including professional identity as a key component of their educational plans.

The findings herein also suggest that agriculture teachers hold professional identities different from those held by agriculturalists, a notion somewhat contradicting the data wherein the majority of the respondents indicated they would pursue careers within the agriculture industry if they were not teaching agriculture. Shoulders and Myers (2011) suggested agriculture teachers’ professional identities were different from those of other teachers, in part, because of their frequent previous first-hand connections with the agriculture industry. The findings here suggest that agriculture teachers either identified as agriculturalists previously and evolved away from these original agriculturalist identities as they gained new educational experiences, or never identified as agriculturalists, perhaps leading them to pursue careers in education. Further research investigating how agriculture teachers develop their professional identities during their preservice teacher education experience, as well as research exploring the differences in professional identity between preservice teachers with and without firsthand experience in the agriculture industry, can assist in better understanding the differences between the professional identities of agriculturalists and agricultural educators.

Findings indicated teachers’ professional identities for each of the three professions was not associated with length of teaching experience. Beijaard et al. (2000) found that while the professional identities of teachers did change over time, that change was dependent upon the discipline in which the teacher was employed. The findings herein suggest that agricultural education may be a discipline in which length of teaching experience has less influence on professional identity than is found in other disciplines, although the reasons for this difference remain unknown. Researchers should investigate the reasons why agricultural educators are resistant to change within their professional identities, as the evolution of professional identity over time is considered part of the development process of successful teachers (Antonek et al., 1997; Beijaard et al., 2004). There is reason to believe focusing on teachers’ development of professional identity could assist in impacting the challenges within agricultural education that have led to decades-long calls for change, such as teacher attrition and STEM integration.

While this study provides new information for researchers and practitioners in the area of agriculture teacher professional identity, its assumptions and limitations also provide opportunity for further research. While the PISC was established as a valid and reliable instrument to evaluate counselors’ professional identities, it relied on previous qualitative literature to understand how professional identity was expressed within counselors’ work. The PISAE quantitatively described agriculture teachers’ professional identities, but we do not yet know how these identities are
expressed through teachers’ behaviors. We recommend qualitative research be conducted with agriculture teachers, students, parents, and administrators to further understand how professional identity influences the behaviors of agriculture teachers, as well as how these behaviors align with scores on the PISAE. Further, because the PISC accurately portrayed the professional identities of counselors, we assumed the PISAE would yield similarly accurate portrayals of other professions. We recommend researchers utilize appropriate parts of the PISAE to examine the professional identities of educators and agriculturalists to ensure the instrument is valid in portraying the identities of professionals in these fields.

References


A Profile of Exemplary Rural Agricultural Entrepreneurship Education Programs

Seth B. Heinert¹ & T. Grady Roberts²

Abstract

Entrepreneurship in rural areas has been seen as a potential tool to mitigate rural outmigration. Entrepreneurship has long been a part of the comprehensive model for school based agricultural programs in the United States, often emphasized through Supervised Agricultural Experience Programs (SAEP). Using case study methodologies, this study sought to identify programmatic characteristics of exemplary rural agricultural entrepreneurship education programs. Results revealed: (a) entrepreneurship was taught primarily through SAEP and (b) entrepreneurship was taught a limited amount through coursework. Results also showed that experiential learning related to entrepreneurship was seen primarily through four examples: SAEP, written business plans, scenarios, and Shark Tank type presentations. Recommendations for practice and future research are provided.

Keywords: entrepreneurship; agricultural education; rural; experiential learning

Introduction

A sustainable agricultural workforce is contingent on youth engagement in agriculture, however many youth in rural areas show a lack of interest in agricultural careers. (Bennell, 2010; FAO, 2010; USDA, 2015). Agricultural entrepreneurship may provide an enticing career option for rural youth. Agricultural entrepreneurship education programs have existed for some time (Acker & Gasperini, 2009; Phipps, Osborne, Dyer, & Ball, 2008), however, little is known about the characteristics of effective programming for this unique type of education.

School based agricultural education (SBAE) programs in the U.S. have a long tradition of engaging rural youth in a balanced program consisting of classroom/laboratory instruction, Supervised Agricultural Experience (SAE), and leadership development/competition (FFA) (Phipps et al., 2008). SAE has provided students with a range of opportunities for career exploration and career development, with one kind of program focusing specifically on entrepreneurship (Phipps et al., 2008). Much of the previous research on agricultural entrepreneurship in the discipline has focused exclusively on SAE (Guthrie, 2013; Hanagriff, Murphy, Roberts, Briers, & Lindner, 2010). However, little attention has focused on a comprehensive entrepreneurship program that spans classroom, SAE, and FFA. This study begins to explore this topic.

Valerio, Parton, and Robb (2014) examined entrepreneurship education programs around the world and concluded these programs can help develop entrepreneurial thinking skills. Additional research looked at youth entrepreneurship programs and concluded co-curricular and extracurricular activities can also enhance entrepreneurship education (Daniel & Kent, 2005; ¹ Seth B. Heinert is a high school agricultural educator at Ogallala High School 801 East O St., Ogallala, NE 69153, sethheinert@opsd.org ² 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 PO Box 112060, Gainesville, FL 32611, groberts@ufl.edu
Morris, Kuratko, & Cornwall, 2013). However, little research has specifically examined exemplary rural youth agricultural entrepreneurship education programs. This study begins to fill this gap. This study aligns with Research Priority Areas 3 and 6 of the *AAAE National Research Agenda* (Roberts, Harder, & Brashears, 2016).

**Conceptual Framework**

This study was guided by a conceptual model (see Figure 1) adapted from the work of Valerio et al. (2014). The model shows participants, program characteristics, and intended outcomes, all bound within the local context. Previous research (Heinert & Roberts, 2017) examined the teacher characteristics. The current study examined program characteristics.

![Conceptual model to study rural agricultural entrepreneurship education.](image)

SBAE programs have a long history of providing hands-on, experiential learning opportunities for students (Phipps et al., 2008). Valero et al. ’s (2014) discussion of entrepreneurship education emphasized the importance of providing a variety of learning experiences for students. Roberts (2006) proposed a model of experiential learning contexts to allow description of different kinds of experiential learning. This lens will provide a mechanism to examine the total entrepreneurship program.

Much of the existing research on rural youth agricultural entrepreneurship is focused on only one aspect of the total program, SAE. Hanagriff et al. (2010) sought to evaluate the economic return on SAE to the state of Texas. They found traditional entrepreneurship SAE programs in Texas – market swine, goats, and beef to be the most prevalent (Hanagriff et al., 2010). Additionally, each school had invested an average of over $93,000 into SAE projects (Hanagriff et al., 2010). They also found $189 million in economic impact from SAE to Texas.

Marx, Simonsen, and Kitchel (2014) sought to describe secondary student’s career decision self-efficacy and career decision influences. They found involvement in supervised agriculture experience programs did not highly influence respondent’s career decisions; however involvement in career development events had a high influence (Marx et al., 2014). Further, they found parents and the agriculture teacher influenced career decisions (Marx et al., 2014).

Guthrie (2013) shed insight on the link between SAE and rural outmigration. She used case study methodology to describe the geography and careers of American degree recipients in Arizona from the 1990’s. While most were previously engaged in entrepreneurship SAE as a portion or whole of their SAE program, most had moved away from rural to urban areas (Guthrie,
Ninety-one percent agreed strongly or generally that their advisor influenced their decision to participate in engaging in an entrepreneurial venture (Guthrie, 2013). Record keeping, public speaking and officer responsibilities positively impacted respondents’ success in their current careers (Guthrie, 2013). Most agreed that participation in a career development event, CDE, influenced their decision to participate in entrepreneurial ventures (Guthrie, 2013).

School based agricultural education (SBAE) has had a tradition of developing international partnerships. Leger, Burnett, and Johnson (2005) reported on the International FFA School to School Linkage Program (SSLP) – a program that linked U.S. high school agriculture students with their counterparts in the former Soviet Union to promote cultural awareness and small-scale agriculture entrepreneurial ventures. In a qualitative case study conducted in 2003, Leger et al. (2005) described how six students and two adults from Louisiana traveled to Russia for a three-week study abroad in 1997-98. The study reported that participants found their lives, and their immediate families lives had changed by several major themes: intellectual development/career guidance choices; developed an international perspective; changed in perception of host country; personal/family development; and a heightened sense of community (Leger et al., 2005).

The importance of wrap around services has also been examined, although not much in the U.S. Owualah (1999) evaluated the Nigerian youth loan scheme, which had been developed by the Nigerian government, to determine if the use of a loan scheme developed self-employment by Nigerian youth. Owualah (1999) concluded that the loan scheme appeared to help develop self-employment in agriculture and other jobs and in rural areas.

Entrepreneurship education programs around the world vary widely in terms of design and delivery as well as content, curriculum, and available wrap around services. Programs are offered at all levels of education and in a variety of settings with, generally, more literature available on university level and training programs. SBAE has a long history of entrepreneurship education through formal curricula as well as supervised agricultural education programs. This model, to varying degrees, has been adopted around the world as a platform for teaching systematic instruction in agricultural education as well as entrepreneurship education in an agricultural context (Okiror, Matsiko, & Oonyu, 2011; Phipps et al., 2008).

**Purpose**

This study was part of a larger inquiry examining exemplary rural youth agricultural entrepreneurship education programs. This study specifically focusing on identifying the programmatic characteristics of these programs. Two objectives guided this inquiry: (a) describe key program characteristics and (b) describe the extent to which experiential learning is implemented into program design and delivery.

**Methodology**

A case study design was used achieve the research purpose (Cresswell, 2013). A case study provides “intensive descriptions and analyses of a single unit or bounded systems such as an individual, program, event, group, intervention, or community” (Merriam, 1998, p. 19). Three exemplary rural youth agricultural entrepreneurship education programs were selected as cases from across the United States. Based on the purpose of this research, a collective case study approach was chosen (Merriam, 1998), allowing us to examine the subject at multiple locations. Focus groups, interviews, and observations were used to collect data necessary to address the objectives.
Case Selection

The first step was to identify states in which to select cases. This process was initiated by reaching out to a wide variety of key informants which included representatives from the National FFA organization Local Program Success, the National 4-H Council, leaders of non-profit organizations focused on rural youth engagement, faculty at universities, and state FFA staff. These key informants were asked to identify states with well-developed rural entrepreneurship education programs. Based on (a) geographic diversity, (b) a variety of total state populations, and (c) diversity of perspectives, the states of Nebraska, North Carolina, and Texas. State agricultural education leaders in these states were asked to nominate ten programs that met the following criteria: (a) program focuses on youth between the ages of 15-24; (b) agriculture is the context for entrepreneurship; (c) most students live in rural communities (less than 2,500 people; USDA, 2013); (d) students are full time students with the option for co-curricular or extracurricular activities; (e) at least 75% of students are engaged in entrepreneurial activities; and (f) the instructor is actively teaching entrepreneurship. Next, the lead researcher conducted a phone interview with each of the program teachers to verify they met the criteria and had interest in participating. Ultimately, three programs (one from each state) were selected as cases. The programs and teachers were given pseudonyms to protect their anonymity.

Data Collection and Analysis

Data were collected face-to-face by the lead researcher on three-day site visits to each program. Data included (a) semi-structured interviews with the teachers in each program; (b) semi-structured focus groups with students in the program, and (c) participant observation captured through field notes, memos, and artifacts. Data for this study were analyzed using a basic thematic analysis (Lincoln & Guba, 1985) guided by our theoretical framework (Roberts, 2006; Valero et al., 2014). Data were analyzed line-by-line with open coding to identify initial themes (Charmaz, 2006; Glaser, 1978). Next, we categorized our themes and organized them within our theoretical framework (Grbich, 2007; Strauss & Corbin, 1990. All research activities were approved by the University of Florida IRB office.

Trust and Rigor

Multiple steps were initiated to ensure trust and rigor in this study (Merriam, 1998). Data were triangulated through multiple sources. Next, the lead researcher spent three days on site at each case to provide a deeper, more accurate interpretation of the local context. Reflexivity was overcome through frequent memoing between the lead researcher on site and the secondary researcher off site. Finally, multiple layers of member checking were used with research participants. First, initial interpretations from each interview and focus group were immediately shared with participants for instant feedback. Second, a debrief was held with the teacher at the end of the three-day visit was held to share initial findings. Finally, a draft of the final report for each case study was sent to the teachers for confirmation of accuracy.

Subjectivity Statement

During the implementation of this research I was a PhD student at the University of Florida and a former agricultural education teacher. My personal history has led to a pro-entrepreneurship bias. I was raised on a cattle ranch and my uncle established his own niche market for show cattle and genetics. My sister and I also partnered on our own herd of cattle. My father also established his own construction business while I was in high school. My personal beliefs are undoubtedly influenced by my family’s long tradition of entrepreneurship.
Findings

Findings are presented for each case and then cross-case comparisons are drawn in the conclusions section of this article. Within each case, data is presented using our theoretical framework to include: (a) the total program [classroom/laboratory instruction, FFA, and SAE], (b) wrap around services, and (c) experiential learning. Emergent themes within each case allowed us to express some of the unique attributes of each program.

Case 1 – Clarkstown, TX

Frequency, duration, and timing of courses. The comprehensive curriculum was delivered systematically over the course of a 12-month calendar year. Courses were taught daily in 45-minute periods for a semester. Class size ranged from six to 22 students. In 2015, there were 212 FFA members in grades 7-12. SAEP was introduced to students briefly in middle school and students more formally in classroom instruction during their freshman year (Artifact 3; Field Notes, day 1). This instruction included a differentiation between different types of SAEP, one of which was entrepreneurship. It was at this time that most students began developing their SAEP. Individual students’ SAEP were conducted at home. Students were allowed to keep track of hours on their SAEP through an online digital record book called the Agriculture Experience Tracker, AET (Field Notes, day 2). There appeared to be a constant thread of FFA related activities happening at all times (Personal Observation). FFA activities happened throughout the day and into the evenings and over weekends. Students prepared for career development events (CDE) over their study hall, before and after school.

Content in classroom/laboratory settings. Content for classroom instruction for the Clarkstown agricultural education program was ultimately guided by the Texas Essential Knowledge and Skills, or TEKS; the state standards for Texas students (Texas Education Association, 2015). The TEKS offers the scope of courses, which may be taught in Career and Technical Education, as well as the specific knowledge and skills students are to gain from taking the respective courses. For the 2015-16 academic year, the Clarkstown program opted to offer: from Ms. Johnson - Principles of Agriculture, Food, and Natural Resources (AFNR) (3 sections), Food Technology (1 section), Radio Broadcasting (1 section), Professional Standards in Agriculture (1 section), Entrepreneurship (1 section); from Ms. Brown - Agriculture Business Management (1 section), Co-Op (1 section), Food Processing (4 sections), Middle School Agriculture (1 section); and from Mr. Williams - Middle School Agriculture (1 section), Floral 1(1 section), Floral / Horticulture (1 section), Wildlife Management (1 section), Ag Mechanics (1 section), Agricultural Power Systems (1 section), and Agricultural Design and Fabrication (1 section) (Artifact 4).

Direct entrepreneurship content was offered, to varying degrees, through a variety of courses. Through the principles of AFNR course, taught by Ms. Johnson, students learned about types of SAE including entrepreneurship (Field Notes, day 1). This course was primarily offered to freshman and the unit focusing on SAE lasted a few weeks. The entrepreneurship course, again taught by Ms. Johnson, focused on developing students’ communication skills through computer applications. Speaking about the entrepreneurship course, Ms. Jonson said, “Because, prior to that [the revision] we were, we just did the Microsoft office suite. And, felt we needed to, you know, increase the rigor, so we added to Adobe and InDesign and Photoshop.” Students’ output from these computer applications was primarily in the form of marketing pieces, such as flyers, advertising for the meat market. In the second semester, students then were asked to develop a mock business, and develop the creative materials for the business.
FFA. Clarkstown had 100% FFA membership of those who were enrolled in an agricultural course (Ms. Johnson, Personal Interview). Generally, there was a lot of enthusiasm around the LDE’s and proficiency awards (Memo). There was a strong culture of success and winning that ran throughout the program (Personal Observation).

Culture of winning. The walls of every classroom and laboratory facility were positively lined with plaques, banners, and other awards from student achievements in career and leadership development events at the district, state, and national level (Personal Observation; Artifact 1). The focus on competition was a common theme running throughout many aspects of the program.

Placement focus in SAE. In addition to classroom instruction, entrepreneurship concepts were taught or reinforced through students’ individual SAEP. Several students stated they had ownership type SAEP, which is considered entrepreneurship from the National FFA Organization’s description of SAE types (FFA, 2012). Students raised or purchased animals, such as cattle and sheep, for the purposes of raising them to show in a competitive environment. All students tracked their SAEP through the online record keeping system, Agriculture Experience Tracker, or AET, which was done in class on a bi-weekly basis.

More peripheral entrepreneurship content, such as business and business management skills, were taught through a variety of avenues. Management of the meats market, for example, was the responsibility of students enrolled in the agriculture business management course (Field Notes, day 2). Students were expected to fulfill all parts of running the store front, such as running the cash register, dealing with customer complaints, and maintaining an inventory on the retail cuts of meat. Students described feeling pressure to perform tasks in the meat market. One female participant from the second focus group said,

Oh, it’s kind of a little bit intimidating…because that’s [the meat] sold to the public. So, if you mess it up, you’ve kind of messed up profit for the school and the department. So, that’s a lot of pressure. But, they prepare us pretty well through that food tech class. (Focus Group 2, female participant)

Overall, courses were taught using a very hands-on approach. Instructors worked to make instruction individualized and could often be seen coaching small groups of three and four students at a time. Students were trained using equipment that simulated industry conditions (Field Notes, day 2).

Wrap around services. Wrap around services existed at the individual level. There was a strong emphasis on higher education and several counseling platforms existed at the school wide level such as the Co-Op class, Community in Schools, and when students would travel to college campuses for CDEs or LSEs. Speaking about the college preparation offered through the program, Joe, a senior, said,

I like that I’ve been getting an idea of what the college atmosphere is like, what everything is about, on top of the dual credit classes I’m taking. So, I wouldn’t really have that big of an opportunity or have that big of a chance to get that interested in higher education or to push myself to get there if it wasn’t for them pushing or all of the things they encourage. (Personal Interview)

There was no evidence of programs that provided student access to finances to support entrepreneurial activities, nor were there formal mentoring programs in place.
Experiential learning. There were many examples of experiential learning, but only a few relevant to entrepreneurship. The entrepreneurship course culminated in a "Shark Tank" type capstone experience, based on the popular television show, where students had to pitch their business ideas, using the collateral pieces they developed, to local business leaders. Doug described the experience as,

We had to make like our whole portfolio, with the budget, and like what building we would rent and how much we would charge for everything. Then at the very end of the year for our final project we had to like pitch it to people. Which that class was very good because it taught us like Photoshop and InDesign and other useful skills which could get you jobs like graphic designers or something. (Personal Interview)

Shark tank businesses could be real or contrived. The primary emphasis for the course was on the effectiveness of the communication pieces the students put together. However, the relevance of the business was a consideration for the competition (Field Notes, day 2).

Case 2 – Prairie View, Nebraska

Frequency, duration, timing of courses. The comprehensive curriculum was where delivered systematically over the course of a 9 month academic year, with twenty days of extended contract dedicated over the summer months for FFA activities (Field Notes, day 1). Courses were taught daily in 45-minute periods for a semester. Class size ranged from ten to fifteen students. In 2015, there were 39 FFA members in grades 7-12. SAEP was introduced to students briefly in junior high and then again their freshman year. This instruction included a differentiation between different types of SAEP, one of which was entrepreneurship. Many students entered their freshman year knowing what their SAEP would be. Individual students’ SAEP were conducted at home, with the exception of the chicken cooperative that had been conducted at Mr. Reed’s home. Students were allowed to keep track of hours on their SAEP through an online digital record book called the Agriculture Experience Tracker, AET. FFA was integrated into classroom instruction. CDE and LSE practices were held for one hour before or after school, and occasionally during breaks throughout the day.

Content in classroom/laboratory setting. Content for classroom instruction for the Prairie View agricultural education program was ultimately guided by programs of study for the agriculture, food, and natural resources career field from the Nebraska Career Education standards (Nebraska Education Association, 2016). For the 2015-16 academic year, the Prairie View program elected to offer one section of agriscience explorations to the 7th graders; one section of plant science/entrepreneurship and ag sales; one section of agriculture, food, and natural resources (AFNR); one section of welding; and two sections of agribusiness.

While entrepreneurship was taught mainly through students individual SAEP, coursework that covered concepts on the topic of entrepreneurship, as well as skills relevant to entrepreneurs, was primarily offered through AFNR; plant science/entrepreneurship and ag sales; and agribusiness. According to the Agribusiness Curriculum Guide (Artifact 2), the course was designed to teach about financial management and personal finance. Topics covered were record keeping, financial analysis, budget analysis, cost and return analysis, cash flow, marketing, business organization, and communications (Artifact 2).

Concepts and skills. Many relevant concepts and skills were taught through the classroom setting relevant to entrepreneurship. Students said the AFNR class was useful for differentiating
between SAE types, specifically entrepreneurship/ownership and other types. Additionally, the
agribusiness class helped students learn concepts such as: “net worth…current assets and
liabilities…how to figure book value and cash flow statements are and…what the different
statements mean” (male participant, Focus Group 2). Mr. Reed added,

We start looking at a marketing plan. Those type projects, all of those that are more
project based in the spring so they kind of understand that, you know, to run a
business, to operate a business, you can’t just go to the bank and say, “Hey, I need
some money.” (Personal Interview)

Record keeping was another skill many students felt they had learned. Students used the
Agriculture Experience Tracker, or AET, program that allowed them to see their net worth. A
female from the second focus group commented that, “…on the AET when you go to enter a
paycheck, it’s always helpful to know what your net worth is and like your grosses….I feel like we
learn a lot about it during the AET for our record books.”

Other concepts and skills cited, especially through participation in the chicken cooperative,
were responsibility (male participant, Focus Group 1), calculating profit (Female participant, focus
group 1), advertising, and processing (male participant, Focus Group 1). A female from the first
focus group who had participated in the cooperative said, “Like cost and knowing how to make a
profit instead of not making a profit and knowing how much you can buy and how much you can’t
buy and how much you can handle.” No doubt there were other concepts and skills learned through
students’ respective SAEP (Personal Observation).

**Pods.** Basically pods were a form of mentorship, chapter officers to younger members. So
each officer was assigned a group of students and then they apply social pressure for them to sign
up for events or participate or show up to activities. Mr. Reed had been doing this for several years
and said that it is really an effective system (Field Notes, day 1).

Specific to entrepreneurship education, Mr. Reed commented in his personal interview that
integrating entrepreneurship into the curriculum was difficult. He thought that the best way may be
through integrating it into all courses, rather than have a standalone course (Mr. Reed, Personal
Interview). He said,

You know, it’s kind of like teaching leadership. Sometimes that’s that fluffy,
warm, fuzzy, you know how do you really teach leadership? Or, I think leadership,
I’d tie a leadership component into all of my classes. I used to have an ag leadership
class. But, it was very hard to keep kids focused and to keep kids kind of on task
because it was, you know, it was just one of those things that, leadership is very
important. But, can you break it out and put it by itself. So, the entrepreneurship,
how do you do that? I think it’s got to be through SAE. (Personal Interview)

Entrepreneurship was, by in large, taught and reinforced through SAEP, even though some
concepts were taught through the classroom and laboratory instruction.

**FFA.** Prairie View had 100% FFA membership of those who were enrolled in an
agricultural course (Mr. Reed, Personal Interview). Generally, there was a lot of enthusiasm around
the LSE’s, proficiency awards (Memo). There was a strong culture of success and winning that ran
throughout the program (Personal Observation).
CDE/LSE. Leadership Skills Events, such as parliamentary procedure and speaking were very popular at Prairie View FFA. Mr. Reed said,

When I got here, Prairie View was basically a new chapter. It had kind of started coming along and, you know, they found some success in leadership skills events. And, I guess, when I got here, we just kind of took the ball and ran with it. We’re going to, this is going to be something that’s important to our chapter. This is something we always want to be good at. … We’ll have a lot of practice. We’ll work hard. But, the benefit there will be the reward at the end. (Personal Interview)

Ms. Collins added, “They have always been so successful when we go to LSE’s whether it’s speaking contests, parliamentary procedure. Our kids just kind of eat that up.” The students had won the district LSE’s for the past decade, and there was a palpable need to continue that legacy (Personal Observation).

Proficiency awards. Another area of success for the chapter had been the proficiency awards. Ms. Collins shared that they had many finalists at the state and national level. She added, “But, it’s really very rewarding I guess just to see those kids being rewarded for the work that they have put in, you know whether it be working on a ranch or, you know, operating their own business…” (Ms. Collins, Personal Interview). Many students began filling out proficiency awards during their freshman year, and continued the practice throughout their FFA involvement (Field Notes, day 1).

Winning. The culture of winning was well established at the Prairie View FFA. Mr. Reed said the younger students got engaged early on. “That’s to me some of the most rewarding because you have freshmen who really don’t think they have a chance…and then the last several years, we’ve had freshmen proficiency finalists at the state convention” (Mr. Reed, Personal Interview). Several students talked about the value they felt in having a successful program. One male from the third focus group said, “We always have teams that qualify for state and I don’t know like the last three we’ve been the top in fruit sales and just we’ve always had really good people that compete in every competition.” Others felt that the chapter was known around the state for their success, specifically in LSE’s and proficiency awards (Focus Group 3). A female from the third focus group summarized it by saying, “… when we have our banquet, like with all the awards, it just goes on and on like everybody knows. Like then, we have so many business supporting us and donating. So, we’re just well known.” Students enjoyed being viewed as successful, and the instructors seemed to feel satisfied that their program was recognized for its success (Personal Observation).

SAE. Teachers encourage students to move to entrepreneurship SAE. Students were very involved and entrepreneurship was taught through SAEP. The emphasis that Mr. Reed placed on SAE seemed to be unique (Personal Observation). With over a decade at the Prairie View program, he said, “I see a lot more kids come in with an entrepreneurship SAE. They’re raising chickens and they have their own garden, things like that” (Mr. Reed, Personal Interview). He would encourage students who had another SAE type, such as placement, to move along to an entrepreneurship SAE (Mr. Reed, Personal Interview). Both a male and a female from the second focus group said,

FEMALE PARTICIPANT: “I’d say quite a bit. If you’re in a placement, he always encourages you to, it’d be a good opportunity for you to buy your own to start your own business.”
MALE PARTICIPANT: “Yeah, he’s always finding ways for you to turn it into an entrepreneurship too.” This expectation for SAE started early. Mr. Reed said that he had eight graders parents already coming up with ideas for their student’s SAEP (Mr. Reed, personal interview). The expectation for SAE, and specifically entrepreneurial SAE, seemed to be well established in the program.

**Entrepreneurship encouraged through SAE.** Entrepreneurship was taught through SAE in Prairie View. One prime example of this was the chicken cooperative example that a half dozen students participated in. A female participant, talking about the initiation of the project, said, “Like, it was all part of our assignment and then we wanted to change it and make it actually happen.” (Focus Group 1). In other words, the conditions were right, as was the student motivation, to start this program. Another example showed the relationship between a student’s individual passions for the enterprise coupled with a suggestion from her advisor was shared by a female student from the second focus group. She said,

> They encourage you to start your own ideas, to start your own entrepreneurship. Like for mine, when I was younger, I used to raise a dog, a Corgi, and she had puppies. Then, she got too old so she no longer has them. But, I was working at the kennel and they encouraged me to get another dog to raise more puppies. So, kind of now already having an interest in it helps a lot too. (female participant, Focus Group 2)

One student described it as Mr. Reed simply “suggesting” he sell firewood, which led to the student initiating that particular SAEP (male participant, Focus Group 2). A female participant from the second focus group shared that, “He also encourages us too because in a small town like Prairie View, you have to have those small businesses, cause you’re not close to a Wal-Mart or Sam’s club so you have to have local businesses.”

**Students were allowed to take risks.** The open and encouraging environment with SAEP provided by the advisors allowed students to take risks. Jane, had already discussed how she had been successful with the radish sauce business when she started to describe the expansion to the broom corn (Jane, Personal Interview.)

> And, the broom corn kind of came along my freshman year. I was just picking out seeds for the garden in Baumgars, and I just kind of came across it and we were just kind of like “Okay, whatever, we’ll plan it, see what happens.” I Googled it, called the local greenhouse, see if they knew anything about it. They didn’t really know anything. So, I basically went off what I found on the internet. (Jane, Personal Interview)

Students were supported in their SAEP through program visits, and SAEP was discussed in class (Personal Observation). The encouraging atmosphere created by the advisors may have led to students feeling supported to take risks (Personal Observation).

**Parents and grandparents influenced student’s SAE.** Most students described the impetus for their SAEP as being from a parent or grandparent (Field Notes, day 2). When talking about the start of their SAE, students would say, “My grandmother made…”, or “Parents kind of helped you”, or “Well, my mom used to work at…”, or “Well, my dad has been a” (Focus Groups 1, 2, and 3). Parents or grandparents occupations or hobbies seemed to directly influence their respective student’s SAEP (Personal Observation).
Passion for SAE. Students showed a passion for their SAEP. Ms. Collins described how two former members had turned the passion for their SAEP into a career.

You know, we had two boys here a few years ago. ...But, both of those being state stars, I mean, just seeing though how that really developed them into their careers. But they both had, both of them, such passions for agriculture. I mean, they just loved it. ...In fact, I know both of them actually when they were interviewed at the state level. I had a couple judges come up to me afterwards and just say, you know, what a true passion for agriculture that they. It just came out that they just had that true passion. So, that’s been neat to see some of that as well, how they have taken it and basically turned it into a career. (Personal Interview)

Often students would say the best part about their respective SAE was that they enjoyed spending time with it, such as raising animals or mowing lawns (Focus Group 1). One of the points of personal connection for student’s SAE was sense of passion they had for it.

Wrap around services. Teachers served as mentors and coaches for entrepreneurship. Beyond that, there were no formal processes in place to partner students with business leaders or other mentors. In fact, Ms. Collins lamented on the lack of formal mentorship. She said, “I just think maybe we need to do a better job of connecting our young people with entrepreneurs that are out there and in our community.” A male participant from the second focus group felt there was adequate access to community mentors and “plenty of people who can help.”

Beyond informal mentoring offered by the agricultural teachers, no structures for networking, job counseling, or higher education counseling were mentioned formally for the program. However, there was ample evidence around the school that these services were being offered through other avenues (Personal Observation).

Experiential learning - SAEP. Students were engaged in personal entrepreneurial experiences through their SAEP. Mr. Reed would help them reflect on successes and failures, typically during project visits. Students were then able to reapply these reflections to further improvements on their respective projects (Field Notes, day 2).

Experiential learning - business plan. Another way experiential learning was used was through the development of business plans. Students were required to develop a business plan as a part of the agribusiness coursework (Mr. Reed, Personal Interview). Mr. Reed said, “Whether it’s a fictitious business plan or something, or they may call it fictitious, but in the back of their mind, they may say, oh, this might be something I wouldn’t mind looking into” (Mr. Reed, Personal Interview). As a result of taking the course, students had the experience of writing an entire business plan.

Experiential learning - scenarios. Students were engaged in experience entrepreneurship through discussing scenarios. Mr. Reed said he would pose situations for students to discuss (Personal Interview). He gave the example of minimum wage and how he would have students evaluate the issue from both the employee and the employer’s side of view (Personal Interview).

Case 3 – Beautiful Hills, NC

Frequency, duration, timing of courses. The comprehensive curriculum was delivered systematically over the course of a 9-month academic year, as well as over the summer. Mr. Miller and Mr. Hill were both on 12-month contracts, so they could supervise SAEP and conduct FFA
activities over the summer. Courses were taught daily in 90-minute periods for a semester. Class size ranged from twenty to thirty students. In 2015, there were 240 FFA members in grades 9-12. SAEP was introduced to students briefly as freshmen. This instruction included a differentiation between different types of SAEP, one of which was entrepreneurship. Many students entered their freshman year knowing what their SAEP would be. Students were allowed to keep track of hours on their SAEP through an online digital record book called the Agriculture Experience Tracker, AET. FFA was integrated into classroom instruction. CDE practices were held for a hour before or after school, and occasionally during breaks throughout the day.

Guiding documents (e.g. state standards). Content for courses offered in the Beautiful Hills agriculture program was driven by guidance from the Career and Technical Education division of the North Carolina Department of Public Instruction (North Carolina Department of Public Instruction, 2016). Mr. Turner used some of the curriculum guides produced by the department fairly extensively. He had them printed and put in a binder. He felt they had enough flexibility in the test and curriculum to teach what he wanted (Field Notes, day 3). For fall, 2015, the Beautiful Hills agriculture program elected to offer 3 sections of horticulture 1 and four sections of agriscience applications, taught by Mr. Miller; 2 sections of animal science 1 and 2 sections of vet science 1 taught by Mr. Hill; and one section of agricultural mechanics taught be Mr. Turner.

Content. Mr. Miller said there was no agribusiness curriculum at the state level (Field Notes, day 2). Content for courses at Beautiful Hills focused on technical agriculture in the courses being taught. In an email, Mr. Miller described the content related to entrepreneurship as,

We offer entrepreneurship instruction as a unit in class more specifically when we teach about the SAE program and options that a student can have in entrepreneurship. The "why" is twofold. First, because it is an opportunity for students to be their own boss, make their own money, assume risk, and hopefully be a happy and productive citizen. Second, it is a requirement of the NC AG Ed. curriculum that the students at least have an understanding of the terms and the options for being an entrepreneur around them. (Personal Interview)

Content related to entrepreneurship was primarily addressed during the agriscience applications course when discussing SAE types, and on an informal basis during SAEP visits and discussions.

FFA - culture of winning. The walls of all three classrooms were lined with plaques from regional, state, and national winning teams and individuals from the past twelve years at Beautiful Hills FFA. Mr. Miller said that proficiency awards were really where he got started and that gave him some early success. Students had been successful with a variety of career development events, as well as proficiency areas (Field Notes, day 1).

FFA - CDE. Career development events were a major focus for the chapter. While they had been successful in a variety of competitions, ag sales had long been one of their highlights. Students felt Mr. Miller was the main driver behind their success and that he had recently started focusing on the agriscience fair competition (female participant, Focus Group 3).

FFA - agriscience fair. Recently, the Beautiful Hills FFA had focused their attention on the agriscience fair competition. I observed them conducting feed trials with chicken and fertilizer trials with strawberries, both using a substance called bio-char. Mr. Miller explained that he liked the agriscience fair because it connected well with the core academic curriculum, students enjoyed it, and few other teachers in North Carolina were doing the competition. Competing in agriscience
fair would, for them, likely equate to a likely early success for his younger members (Field Notes, day 2).

**SAE.** SAE, and specifically entrepreneurship type SAE, was very strong at the Beautiful Hills FFA. A female participant in the third focus group felt SAE’s were the best vehicle used to get students involved in business. Mr. Miller described it as

We have a very strong SAE program that we teach in class and monitor frequently outside of normal class time. The agriculture teacher team tries to visit each product as frequently as possible and through these interactions we try and help the student develop a plan to grow if that is there goal or a plan to divert any obstacles or challenges they see arising. (Mr. Miller, email)

One female from the first focus group described her newfound affinity for agriculture and entrepreneurship through her sheep SAE. She said, “I actually wanted to be a nurse [but] I thought about it seriously and I was like once I got the sheep, I was like, no, I want to start my own business. I want to become an entrepreneur.” The conversations that happened outside of the classroom centering on SAE seemed to have the most influence on students toward entrepreneurship awareness and mindset.

**SAE Types.** Several students interviewed had livestock production type SAEP, such as beef, sheep, or dairy production. Some had placement or crop production. One worked on a research facility.

**SAEP Expectations.** There was a strong expectation that students engage in a meaningful SAEP at the Beautiful Hills program. One male participant from the first focus group said,

So, basically, everyone has to do an SAE, but they’re not very, they’re very easy to do cause you basically just write what you do and the amount of time you spend doing it. So everybody does one, but you know, some people they actually show, like they go all out on their SAE projects and they, you know, show a real interest in it and they liked telling you all about it and so that’s where like [Mr. Hill] will take their SAE and he’ll turn it into an agriscience fair project and [Mr. Miller] will take your SAE and turn it into a proficiency award. (male participant, Focus Group 1)

A male participant from the first focus group echoed previous comments about it being up to the student’s own initiative as to how successful the SAEP would become. He said, “Everybody starts with one and you know, from there however much time they put into it depends on how far they can go with it.” Another male from the first focus group added that the freshmen came in expecting to start their SAEP. This was a source of excitement and pride for many students (Personal Observation).

**Allowed to take risks and fail.** Students were given quite a lot of autonomy with their SAEP. One male participant of the first focus group described, in detail, the purchase and sale of several livestock enterprises such as sheep, chickens, and heifers. He talked about the experiences he had gained along the way when, for example, the chickens decided to stop laying eggs, or the sheep start lambing at the wrong time of year. He added,

But, you know, but that’s where I got advice from [Mr. Miller]. He’s telling me you need to do this, you need to do this, you need to make sure you’re doing this.
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Don’t get flooded with all this stuff. So, I mean, they’ve [shown] it to me, they’ve helped me the best they could, but it just came down to my slack, slack was the reason mine didn’t work. But, I mean, then again, I’ll probably have animals again before too long. (male participant, Focus Group 1)

This student had earned and spent thousands of dollars trying new ventures. He had reflected on the successes and failures of the ventures. Ultimately, there was a climate through SAEP, that it was acceptable for students to take risks and fail, so long as they were learning (Personal Observation).

Wrap around services. The leading example of mentors and coaches, aside from CDE coaching, was through students’ family members. Both males and female participants from the third focus group said their uncles had been their mentors. Several other students described being able to seek a family member for advice and counseling (Field Notes, day 2). While agriculture teachers served as mentors and coaches, it cannot be missed that family members were serving in similar capacities.

Experiential learning. While students were engaged in experiential learning for regular instruction in agricultural education, the primary evidence of experiential learning for entrepreneurship education was through SAEP. Students were engaged in personal entrepreneurial experiences through their SAEP. All three advisors would help students reflect on successes and failures, typically during project visits. Students were then able to reapply these reflections to further improvements on their respective projects (Field Notes, day 3).

Conclusions

Delivery of Entrepreneurship Education Programming

While the three cases in question had many similarities and differences across all of the different sub-constructs representing program, the two deemed most relevant to entrepreneurship education were SAEP and coursework. Several conclusions can be drawn. First, entrepreneurship was taught primarily through SAEP. Hands down, SAEP was the primary mode of engaging students in entrepreneurship education. Teachers, especially from the Prairie View case, worked to help students find entrepreneurship type SAEP. Further, this teacher challenged his students to go beyond owning a livestock and calling it entrepreneurship. Instead, he strived for innovative programs.

Our second conclusion was that entrepreneurship was taught a limited amount through coursework. Coupled with a strong emphasis on entrepreneurship SAEP was coursework that taught varying aspects of entrepreneurship. It is important to note that entrepreneurship was not taught as a standalone course, nor was it the primary focus of any of these cases. Clarkstown had a class called entrepreneurship, but the content focused mainly on agricultural communication skills. It was through courses such as agribusiness that entrepreneurial management concepts and skills were taught.

The findings of this study are consistent with traditional design of school-based agricultural education programs with three components: classroom/laboratory instruction, SAE and FFA (Phipps et al., 2008), but contradicts Valero et al.’s (2014) conceptualization of a comprehensive entrepreneurship education program. No program in this study had a robust classroom curriculum or classes focused solely on entrepreneurial outcomes. It is noteworthy that the types of SAE students noted were primarily salary-substitute and possibly lifestyle entrepreneurial firms, with
none showing the characteristics of entrepreneurial firms (Barringer & Ireland, 2012). Barringer and Ireland (2012) noted that entrepreneurial firms tend to be more innovative than the other two firm types.

Experiential Learning Implementation

Experiential learning was used throughout the programs to offer comprehensive instruction in agricultural education, which is consistent with best practices for SBAE (Phipps et al., 2008). Experiential learning related to entrepreneurship was seen primarily through four examples: SAEP, written business plans, scenarios, and Shark Tank type presentations.

SAEP. Student run SAEP was the most universal experiential learning platform for entrepreneurship education at these schools. Students engaged with their own entrepreneurship ventures, were guided through reflection with their advisor, and applied new insights back into their enterprise. The extent to which they learned entrepreneurship concepts and skills depended on the advisor and the student.

Business plans. One case, Prairie View, had students write a formal business plan. While not a new example of student work in agricultural education, it is certainly still relevant for entrepreneurship education. Students experienced a real-life scenario with conditions that mimicked the plausible characteristic students’ may face and took steps to create a business plan.

Scenarios. Scenarios were used to pose real life business situations to students to spark discussion. These were typically offered in the classroom setting.

Shark Tank. A mock presentation modeled after the television show Shark Tank was used to allow students to showcase the marketing pieces they put together for the mock business they developed.

While others have cited the use of experiential learning (Morris et al., 2013), the specific examples from the present study were different from previous studies. Ruskovaara and Pihkala (2013) described the use of in class discussions about current events and the use of stories. Beyond classroom exercises, SAEP is an educational tool available to agricultural education teachers (Phipps et al., 2008) to better contextualize and apply entrepreneurship principles (Valero et al., 2014).

Recommendations for Teachers

Imbed entrepreneurship in practice through experiential learning across the entire program. Experiential learning has been used in a variety of contexts to facilitate engagement and learning in entrepreneurship education. Teachers within this study used classroom experiences such as having students write a business plan, pitching their business ideas in a Shark Tank style presentation, and using scenarios to think critically about real world examples of situations entrepreneurs may find themselves in. SAEP is also an experience for students and may be used as a learning tool if done properly. However, there is almost limitless opportunity to enhance instruction through experiential learning activities and practice for entrepreneurship education in a SBAE context.
Recommendations for Future Research

Design and implement an intervention for entrepreneurship education within the context of SBAE. This study identified two general avenues where entrepreneurship education was being offered – somewhat through the classroom, and mainly through SAEP. So, a host of interventions through these two components could be devised and implemented and measured through such dependent variables as entrepreneurial self-efficacy or entrepreneurial mindedness.

Identify ways that entrepreneurship can be incorporated into or enhanced through SAEP. Entrepreneurship/ownership is an existing category for proficiency areas within the national FFA structure. Perhaps the current structures limit the innovativeness of entrepreneurship type SAE. Future research may need to explore the most effective means for approaching the entrepreneurship domain within SAEP, as well as adjustments to SAEP that could further incentivize innovations within entrepreneurship type SAE’s.

References


Agricultural Mechanics Lab Safety Practices in South Texas

Steven Boot Chumbley¹, Mark S. Hainline², & J. Chris Haynes³

Abstract

A pressing concern in all agricultural mechanics courses is safety. Lab activities have an inherent propensity to cause serious injury. The safety practices which are taught by teachers are largely dependent on the equipment in the laboratory and the resources available to the program. Various researchers have indicated that problems have existed in the safety instruction of agricultural mechanics for some time. This study sought to determine how safety is taught, what equipment instructors use and attitudes towards teaching safety of agricultural mechanics teachers. The majority of instructors were certified in first aid and felt confident to use that training in the event of an emergency. The average teacher was found to teach high enrollment labs and furnished at no cost to the student eye protection in the form of safety glasses with side shields. It was found that teachers agreed that safety instruction in the lab was important, especially involving power tools, electricity, and industrial quality eye protection. Agricultural programs should be evaluated regularly for inadequate conditions that may exist in facilities, equipment, and safety. Additional research is needed targeting what barriers potentially exist with teachers using recommended safety practices in the instruction of agricultural mechanics.

Keywords: agricultural mechanics; safety practices; agricultural science teachers.

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Introduction

Among the myriad of responsibilities affixed upon the shoulders of agricultural mechanization teachers, the most pressing responsibility is maintaining laboratory safety. Laboratory activities such as metal working, agricultural machinery repair, and wood working have an inherent propensity to cause serious injury or death to the students and instructors. With that said, it is imperative that teachers maintain a high regard for safety by providing adequate supervision to students working in the laboratory, and teaching students safety procedures to follow when working with tools and equipment. Saucier and McKim (2011) indicated that the largest areas of need for preservice teachers in Texas were repairing and maintaining equipment and safety in the laboratory. Although, ensuring student safety is a moral obligation of agricultural mechanics.

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teachers, failure to properly maintain a safe working environment can be associated with legal ramifications for teachers (Gliem & Hard, 1988).

According Phipps, Osborne, Dyer and Ball (2008), laboratory activities constitute a large part of most agricultural education programs. Agricultural laboratories serve many purposes and provide inquiry-based learning environments for students. Along with traditional agricultural mechanics laboratories, secondary agricultural programs utilize laboratories such as greenhouses, aquaponics centers, and livestock facilities. Each laboratory possesses unique dangers, but due to the nature of agricultural mechanics laboratories, injuries in these labs are commonplace. One aspect of agricultural mechanics which heightens the propensity for injuries is student-based construction.

At an industry standpoint, construction is also one of the most dangerous industries in the world (Brunette, 2004; Cheng, Lin, & Leu, 2010). There are many job practices in the realm of agriculture mechanics which intersect with practices in the construction industry (e.g., use of power tools, metal fabrication, etc.). Schoonover, Bonauto, Silverstein, Adams, and Clark (2010) noted these industries were particularly dangerous because workers lack the appropriate safety training. Furthermore, Pinto, Nunes, and Ribeiro (2011) indicated a lack of occupational risk assessment (ORA) and safety culture among future employees in these industries.

In regard to both industry and educational settings, enhancing safety climate in work and learning environments is vitally important. Cultivating a culture of safety in students early is a key to reducing laboratory-based injuries (Gillen, Goldenhar, Hecher, & Schneider, 2013). Along with safety climate, Torner and Pousette (2009) added that project characteristics and individual competencies/attitudes are main components contributing to safety standards. Agricultural mechanics, a facet of career and technical education (CTE), aims to prepare students for future careers in various industries. Exposing students to a culture focused on safety in the school setting can bolster students’ competencies of safety, and can result in reduced future workforce injuries.

A multitude of previous studies have noted that agricultural education preservice teachers’ fail to receive adequate laboratory safety education prior to their first year of teaching (Dyer & Andreasen, 1999; Swan, 1992). The adequacy of teacher preparation programs providing preservice safety education is important. One possible culprit of the problem is the reduction of credit-hours in undergraduate programs, restricting the implementation of additional agricultural mechanics courses which address safety issues. In support of this notion, Burris, Robinson, and Terry (2005) found that teacher preparation professionals believed agricultural mechanization instruction was important in pre-service programs, yet they indicated the pre-service teachers received less than adequate instruction for the duties they would encounter as a teacher. On the other hand, Lawver (1992) posited that teachers were using recommended safety practices, but failed to provide the practices to the extent warranted when working in a dangerous environment. Along with the noted shortcomings of teachers in regard to knowledge and application of shop safety, Walter (2002) noted agricultural laboratories are lacking in the following areas: appropriate posting of warning signs, appropriate implementation of safety inspections, and the use of proper personal protective equipment (PPE).

According to Bear and Hoerner (1986), (1) identifying the safety practices taught, (2) the instructional methods by which the teacher informs their students of safety practices, and (3) an investigation of available safety equipment are the three components which must be observed to assess the safety of an agricultural mechanics laboratory. The instructional methods used to teach safety practices varies from teacher-to-teacher. The most common instructional methods used in agricultural mechanics are demonstrations, worksheets, and videos (Dyer & Andreasen, 1999;
Lawver, 1992). Burris et al. (2005) noted the demonstration of safety techniques was essential in laboratory settings. In agreement with Burris et al., Harper (1984) found that when teachers demonstrated appropriate safety practices, students were more safety conscious and demonstrated a deeper understanding of safety.

The safety practices which are taught by teachers is largely dependent on the equipment in the laboratory and the resources available to the program. Aside from instruction of safety procedures taught about specific equipment, eye protection safety has been previously noted as a topic which is commonly addressed with high priority (Chumbley, 2015; Lawver & Fraze, 1995). Similar to safety instruction on equipment, training students about PPE is contingent on the tools and machinery used in the agricultural mechanics laboratory. In a laboratory safety practices study conducted in New Mexico, Chumbley (2015) found that industrial quality eye protection, welding gloves, hearing protection, and a shop coat were the most commonly used PPE in the agricultural education laboratory.

To mitigate the unemployment rates in the South United States, and the predominantly Hispanic population living within these areas, technical training is needed to prepare the workforce for the industries (agriculture, construction, engineering, and manufacturing) with projected growth. One such training entity, which equips individuals with the knowledge and soft skills to excel in various industries, is Career and Technical Education (CTE). More specifically, the CTE cluster of Agriculture, Food, and Natural Resources (AFNR) within Agricultural Mechanics that provides students with vocational training for industries such as agriculture, construction, metal fabrication, mechanical skills, woodworking, and agricultural engineering.

While teachers have rated teaching safety as a high priority, their knowledge concerning the management of an agricultural mechanics laboratory has shown to be low. As previously noted, Saucier and McKim (2011) identified laboratory safety and instruction as an area of professional development need for Texas teachers. Approximately 80% of Texas high school agricultural science programs offer some type of agricultural mechanics course (January 2017, Texas State FFA personal communication). To determine the structure of professional development to bolster teachers’ ability to teach laboratory safety, it is first important to determine how safety procedures are currently being taught in Texas programs. Hence, there was a need to examine the agricultural safety and laboratory management practice of south Texas teachers. Determining the methods teachers use to provide safety instruction, safety procedures implemented, and personal protective equipment used assist teacher educators and state leaders in providing appropriate training and in-service instruction to their stakeholders. The need for providing effective professional development is called for in the National Research Agenda for Agricultural Education, Research Priority Five: Efficient and Effective Agricultural Education Programs. Thoron, Myers, and Barrick (2016) noted “research in the context of agricultural education… is needed to evaluate the effectiveness of these established professional development attributes and can greatly improve the body of knowledge on effective professional development” (p. 45). Along with these aspects contributing to effective professional development, the ultimate benefit of this research was to provide a safer learning environment for students and instructors in agricultural mechanics laboratories.

**Theoretical Framework**

The theoretical framework for this study was based around the theory of planned behavior (Azjen, 1985), which is an extension of the theory of reasoned action (Fishbein & Azjen, 1975; Azjen & Fishbein, 1980). Fishbein and Azjien’s (1975) theory of reasoned action grew out of the need to better understand behavior because of motivational stimuli (Madden, Ellen, & Ajzen, 1992). Researchers compared and analyzed both theories for “… 10 behaviors chosen to represent
a range with respect to control over performing the behavior” (Madden, Ellen, & Ajzen, 1992, p. 3). There were two hypothesis analyzed, “. . . the inclusion of perceived behavioral control would significantly enhance the prediction of intentions and target behavior, [and] . . . that the enhancement in the prediction of target behavior would be related to the magnitude of perceived behavioral control” (Madden, Ellen, & Ajzen, 1992, p. 3-4), with both hypothesis supported by the data. Resulting from the research, it was theorized that the theory of planned behavior is superior to the theory of reasoned action when predicting target behavior (Madden, Ellen, & Ajzen, 1992). However, both theories were designed to demonstrate the connection between the influences of information and motivation on performance (Connor & Armitage, 1998).

It is suggested through the planned behavior theory that an individual’s values and beliefs are influenced by knowledge and demographic variables, which influence attitude, intention, and behavior (Chumbley, 2015). The confidence levels of agricultural teachers and their success in teaching laboratory safety are impacted by both the theory of planned behavior and the theory of reasoned action. Behavior is seen as a function of intentions and control, which is represented in the theory of planned behavior (Azjen, 1991). Additionally, those motivational factors that indicate an exertion of effort to perform a behavior are correlated with how hard people are willing to try. This can be linked to the confidence of teachers and Bandura’s self-efficacy theory (Bandura, 1984), where their “Self-efficacy can enhance or impair performance through their effects on cognitive, affective, or motivational intervening processes (Chumbley, 2015, p. 4). When an individual has a low self-efficacy level regarding a task, it is highly likely that their success will be low, but when they have perceived a higher level of self-efficacy, then the likelihood for success is considerably higher (Bandura, 1997).

Both theories imply that the experiences and characteristic behaviors of teachers of agricultural mechanics can impact their resolutions to properly teach the safety aspects and standards, as well as the extent to which they deliver the safety instruction in their courses. An understanding of these experiences and characteristic behaviors will allow researchers an enhanced opportunity to determine successful teacher implementation of safety in their courses (Chumbley, 2015).

**Purpose and Objectives**

The purpose of this study was to identify the safety practices of South Texas agricultural science teachers, specifically focusing on underrepresented teacher populations, for teaching safety and managing an agricultural mechanics laboratory environment. The following objectives guided this study:

1. To determine demographic and safety characteristics of south Texas agricultural science teachers.
2. To determine the availability of selected safety equipment and emergency items in south Texas agricultural mechanics laboratories.
3. To identify the instructional methods and materials used by teachers to teach agricultural safety.
4. To investigate perceptions held by south Texas agricultural science teachers concerning the importance of agricultural mechanics safety instruction and practices.

**Methods**

The target population for this descriptive study was South Texas secondary agricultural science teachers who offered an agricultural mechanics component within their programs. The
majority of these teachers (82%) identify as Hispanic, an underrepresented population in national agricultural education (Roberts et al., 2009). A list of teachers was obtained from the Texas public education department. Dillman’s Tailored Design Method (2007) guided the collection of data and correspondence with census participants. The researcher identified individuals from Texas Area X FFA association for the sample population. The Texas FFA Association is comprised of 12 administrative subdivisions (i.e., areas). In general, the areas are separate geographic regions which are realigned every 10 years based on student membership. In fact, in 2016, the Texas FFA added two additional areas, transitioning from 10 to 12 areas. Area [#], located in south [STATE], is comprised of 27 counties, 95 FFA chapters, and over 10,000 FFA members (Texas FFA Association, 2016).

The Area [#] region included 192 agricultural science teachers, of which 172 teachers taught at least one agricultural mechanics course. Those teachers who identified themselves as teaching at least one course in an agricultural mechanics laboratory \(N = 172\) were asked to complete the survey. Teachers were asked to complete an online survey through SurveyMonkey, an online survey software tool. Subjects were contacted up to five times through e-mails from the researcher. There were 118 respondents to the survey, resulting in a response rate of 69%. To control for non-response error, the responses of early respondents were compared to responses of late respondents (Miller & Smith, 1983). Similar to Connors and Elliot (1994), a comparison of the two groups was assessed using t-test on Likert-scale items, which revealed no significant \((p < .05)\) differences between the two groups.

The instrument used for this study was one previously employed by Lawver (1992) to assess safety practices of teachers in [STATE]. This instrument is a modified version of an original instrument developed by Hoerner and Kessler (1989). The instrument used in this study has been successfully exercised in similar studies of other states (Johnson & Fletcher, 1990; McKim & Saucier, 2011; Chumbley, 2015). To ensure face and content validity a panel of experts \(N = 9\) consisting of five university faculty and four agricultural science teachers were consulted. Recommendations to update language in the instrument were considered and integrated into the instrument. Cronbach’s alpha coefficients were used to measure internal consistency in order to establish reliability. The data revealed a reliability Cronbach’s alpha coefficient of .823, exceeding the appropriate reliability threshold \((\alpha = \geq .70)\) posited by Fraenkel and Wallen (2000).

Part one of the instrument focused on demographic information and the safety materials most readily used and available in the agricultural science laboratory. This included information about years of teaching experience, college hours in agricultural mechanics, number of students enrolled in the program, what certifications the teacher had received concerning safety and average number of courses taught. The instrument also sought to identify the number of major and minor accidents that occurred in the agricultural mechanics laboratory. Injuries in the lab can vary greatly based on the type of work being performed and environment. Major injuries were characterized as injuries that resulted in a student not being able to effectively perform laboratory duties for more than one day after the injury. Examples provided to teachers included second degree burns, concussions, major falls, and broken bones. The researcher felt this was important as employers with 10 or more employees are required by the Occupational Safety and Health Administration (OSHA) to report similar information.

The second section of the survey instrument solicited responses concerning most commonly used safety practices and instructional methods utilized for teaching safety. The teachers were asked to indicate the availability and use of PPE in their shop. More specifically, teachers were asked about the types of eye protection (e.g., full face shields, spectacles, goggles) and general PPE items (e.g., hearing protection, gloves, jackets, respirators, hard hats, or steel toed boots) most
frequently used in the school shop. The instrument also inquired if the PPE was school furnished or student furnished. The second section of the survey also sought to determine the instructional strategies and materials used by the teachers to teach safety. For example, teachers were asked “where do you devote the most time in teaching safety in agricultural mechanics?” and “what teaching materials do you use to teach safety?”

This section of the survey concluded with questions pertaining to teacher’s perceptions of safety in the agricultural mechanics laboratory. On a five-point Likert-Type scale (1 = little importance to 5 = highest importance), the agricultural mechanics teachers were asked to indicate their perceived importance of agricultural safety instructional topics (e.g., teaching power tool safety, administering safety exams, teaching electrical safety). On the same five-point scale, teachers were asked to report their perceived preparedness to teach safety related to various topics (e.g., developing safety posters, teaching about state safety laws or welding exhaust systems).

Findings

Objective One

The first objective was to describe characteristics of the South Texas agricultural mechanics programs and of the teachers who were supervising these programs. As stated earlier in the manuscript, 82% of the respondents identified as Hispanic. The average respondent had 12 years teaching experience with the most novice teacher having six months of teaching experience and the most senior having 39 years of teaching experience. Table one illustrates the average number of college agriculture mechanics courses teachers had taken.

Table 1

<table>
<thead>
<tr>
<th>Number of Courses Taken</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>9</td>
<td>7.63%</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>8.47%</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>12.71%</td>
</tr>
<tr>
<td>3</td>
<td>23</td>
<td>19.49%</td>
</tr>
<tr>
<td>4</td>
<td>27</td>
<td>22.88%</td>
</tr>
<tr>
<td>5 or more</td>
<td>34</td>
<td>28.81%</td>
</tr>
</tbody>
</table>

Teachers taught an average of one (n = 20; 16.95%), two (n = 20; 16.95%), three (n = 29; 24.58%), four (n = 19; 16.1%), five (n = 12; 10.17%) and six or more (n = 18; 15.25%) of agricultural mechanics courses per semester. Thirty-one percent of the Texas Agricultural Science Teachers reported having liability insurance (i.e., up to $100,000), 54% of the teachers were unsure if they were covered, and 15% indicated they had no liability insurance at all. All programs surveyed had some type of separate agricultural mechanics lab with the average size ranging from 1,000 to 2,000 square feet. Table two describes additional characteristics of the agricultural mechanics programs.
Table 2

Characteristics of the Agricultural Mechanics Programs (n = 118)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>M</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students in agricultural mechanics program</td>
<td>192</td>
<td>22</td>
<td>600</td>
</tr>
<tr>
<td>Average class size</td>
<td>18</td>
<td>4</td>
<td>30</td>
</tr>
</tbody>
</table>

We found that 60% (n = 71) of teachers were certified in first aid compared to 40% (n = 47) who were not. Of those trained in first aid, 88% of teachers felt confident to use that training in an emergency. The two most common safety certifications teachers had received included the National Center for Construction Education and Research (NCCER) and Occupational Safety and Health Administration (OSHA) safety certifications. Some other safety certifications teachers identified included university safety certifications and American Welding Society (AWS). Teachers felt “moderately” to “very well prepared” (n = 112, 94.92%) to provide safety instruction within their classes. It was found that 56% (n = 66) of teachers kept a written report of all accidents in their lab.

Objective Two

Objective two was to determine the availability of selected safety equipment and emergency items in south Texas agricultural mechanics laboratories. Teachers were also asked to respond to the use of eye protection in their educational laboratories. Full face shields and Spectacles (ANSI Z87+) with side shields were the most common types of eye protection found in the laboratory environment. Most teachers were found to provide eye protection to the students at no cost. It was found that 83% of programs stored safety glasses in the lab either by use of a commercial cabinet or custom made storage device, the remaining programs had students store glasses on their own and bring to class. The types of eye protection most often found in the agricultural mechanics lab and how teachers managed their use are listed in table three.

Table 3

Teachers’ Use of Eye Protection in the Agricultural Mechanics Lab (n = 118)

<table>
<thead>
<tr>
<th>Most Common Types Used</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Face Shields</td>
<td>103</td>
<td>92.79</td>
</tr>
<tr>
<td>Spectacle with Side Shields</td>
<td>86</td>
<td>77.48</td>
</tr>
<tr>
<td>Goggles</td>
<td>79</td>
<td>71.17</td>
</tr>
<tr>
<td>Spectacles without Side Shields</td>
<td>52</td>
<td>46.85</td>
</tr>
<tr>
<td>How is Eye Protection Provided</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School Furnished at No Cost to Student</td>
<td>103</td>
<td>92.79</td>
</tr>
<tr>
<td>Students Furnish Their Own</td>
<td>8</td>
<td>7.21</td>
</tr>
</tbody>
</table>
The researchers found that teachers had an extensive amount of available safety equipment in the lab. The most prevalent items found in the lab include industrial quality eye protection, welding gloves and welding aprons or jackets. The least common safety items found were hard hats, steel toed boots and fire resistant shirts. Table four provides information about what safety items were available in the laboratory to students.

Table 4

<table>
<thead>
<tr>
<th>Safety Items</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Quality Eye Protection</td>
<td>107</td>
<td>96.40</td>
</tr>
<tr>
<td>Welding Gloves</td>
<td>106</td>
<td>95.50</td>
</tr>
<tr>
<td>Welding Apron or Jacket</td>
<td>94</td>
<td>84.68</td>
</tr>
<tr>
<td>Hearing Protection</td>
<td>83</td>
<td>74.77</td>
</tr>
<tr>
<td>Shop Coat or Overalls</td>
<td>53</td>
<td>47.75</td>
</tr>
<tr>
<td>Respirators</td>
<td>41</td>
<td>36.94</td>
</tr>
<tr>
<td>Hard Hats</td>
<td>21</td>
<td>18.92</td>
</tr>
<tr>
<td>Steel Toed Boots</td>
<td>11</td>
<td>9.91</td>
</tr>
</tbody>
</table>

Other safety items provided in the lab included welding sleeves, steel toed boots, and donated old welding shirts. The most common safety materials and practices involved the use of fire extinguishers, industrial quality eye protection, welding gloves, properly marked exits, fire alarms, and eye wash stations. Safety posters, marked safety zones, and fire blankets were the least common safety materials found in the agricultural mechanics laboratories.

**Objective Three**

The third objective sought to identify the instructional methods and materials used by teachers to teach agricultural safety. Teachers were found to devote a range of times to teaching safety, with 41% \((n = 48)\) devoted to teaching safety less than a third of their time, 36% \((n = 42)\) devoting 1/3 to half of their time to teaching safety and the remaining 23% \((n = 27)\) using over half their instructional time teaching safety topics. Teachers were prompted with the questions “Where do you devote the most time in teaching safety in agricultural mechanics?”. The researchers found that 25.23% \((n = 30)\) taught safety as a separate unit, 24.32% \((n = 29)\) taught safety by integrating into each instructional unit and 50.45% \((n = 59)\) taught safety equally in a separate unit and within other instructional units.

Safety in the agricultural mechanics lab was found to be taught in a variety of ways. The most common lessons included safety demonstrations with hand tools \((n = 115, 97.3\%)\), demonstration lessons with power tools \((n = 113, 95.5\%)\), assessments on laboratory safety exams \((n = 114, 94.59\%)\) and using a laboratory clean up schedule \((n = 82, 69.37\%)\). Only 37% \((n = 44)\) utilized routine safety inspections along with 26% \((n = 31)\) designating a cleanup foreman along with the cleanup schedule.
When asked what materials are used to teach safety to their high school students, teachers were most likely to take advantage of hands-on safety materials ($n = 113, 95.5\%$), videos ($n = 105, 90\%$), worksheets ($n = 104, 89.2\%$) and computer program ($n = 70, 59.2\%$). Other instructional materials utilized included transparencies, YouTube, textbooks, and local presenters from industry representatives.

**Objective Four**

The final objective was to investigate what teachers perceived was the most valuable in regards to safety topics in the agricultural mechanics lab. Respondents were asked to rank the importance of various agricultural safety instructional topics. The value of each topic was measured on a Likert-Type scale ranging from 1-5 ($1 = \text{little importance} \text{ to } 5 = \text{highest importance}$). Teachers felt the most important topics were power tool and electrical safety. Respondents felt that the least important topics were the development of safety posters and accident report forms. Table five presents a rank order listing of most important topics identified by teachers.

Table 5

*Teachers’ Perceptions of Important Safety Topics (n = 118)*

<table>
<thead>
<tr>
<th>Safety Topic</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Tool Safety</td>
<td>4.61</td>
<td>0.57</td>
</tr>
<tr>
<td>Electrical Safety</td>
<td>4.60</td>
<td>0.60</td>
</tr>
<tr>
<td>Welding Exhaust Systems</td>
<td>4.40</td>
<td>0.76</td>
</tr>
<tr>
<td>Hand Tool Safety</td>
<td>4.40</td>
<td>0.68</td>
</tr>
<tr>
<td>Administration of Safety Exams</td>
<td>4.32</td>
<td>0.70</td>
</tr>
<tr>
<td>Industrial Quality Eye Protection</td>
<td>4.28</td>
<td>0.53</td>
</tr>
<tr>
<td>Laboratory Safety Inspections</td>
<td>3.83</td>
<td>0.95</td>
</tr>
<tr>
<td>Accident Report Forms</td>
<td>3.50</td>
<td>1.01</td>
</tr>
<tr>
<td>Safety Posters</td>
<td>3.34</td>
<td>0.91</td>
</tr>
</tbody>
</table>

*Note. Importance scale (1= little importance to 5 = highest importance).*

The final question teachers were asked was to rate how well they felt prepared to provide safety instruction related to various instructional topics. The responses were measured on a five point scale of $1 = \text{poorly prepared} \text{ to } 5 = \text{very well prepared}$. Respondents felt the best prepared to teach the industrial eye protection and welding exhaust systems. They felt the least prepared to teach various safety topics related to color coding of shop equipment, developing safety posters, making accident report forms, and state safety laws. Table six lists teacher preparedness to teach various safety topics in rank order.
Table 6

Teachers’ Preparedness to Provide Safety Instruction (n = 118)

<table>
<thead>
<tr>
<th>Safety Topic</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Quality Eye Protection</td>
<td>4.33</td>
<td>0.74</td>
</tr>
<tr>
<td>Welding Exhaust Systems</td>
<td>4.02</td>
<td>0.90</td>
</tr>
<tr>
<td>Electrical Safety</td>
<td>3.98</td>
<td>0.82</td>
</tr>
<tr>
<td>Clean Up Schedules</td>
<td>3.62</td>
<td>0.89</td>
</tr>
<tr>
<td>Developing Safety Posters</td>
<td>3.59</td>
<td>0.96</td>
</tr>
<tr>
<td>State Safety Laws</td>
<td>3.51</td>
<td>0.83</td>
</tr>
<tr>
<td>Color Coding Safety Equipment</td>
<td>3.50</td>
<td>1.02</td>
</tr>
<tr>
<td>Accident Report Forms</td>
<td>3.48</td>
<td>1.02</td>
</tr>
</tbody>
</table>

Note. Preparedness scale (1 = poorly prepared to 5 = very well prepared).

Conclusions and Recommendations

The purpose of this study was to identify the safety practices of South Texas agricultural science teachers, specifically focusing on underrepresented teacher populations, for teaching safety and managing an agricultural mechanics laboratory environment. Findings of the study indicated participants perceived themselves to be adequately prepared in many aspects of safety in a school-based agricultural education program. The teachers’ indication of preparedness provides insight on the teachers’ perceived behavioral control of providing a safe work environment.

Although attitudes, normative beliefs, and perceived behavioral control constitute the three largest contributing factors in the theory of planned behavior (Azjen, 1985), other background factors can have an indirect impact on an individual’s actions. According to Peng, Zhi-cai, and Linjie (2014), the theory of planned behavior “recognizes the importance of background factors, such as personality, emotions, education, age, gender, and experience; although if they affect behavior, it would be via beliefs” (p. 3). The teachers in this study had an average of 12 years of teaching experience and over 70% of the teachers had previously taken three or more agricultural mechanics courses. It is implied the teachers past experiences influenced their safety behaviors. Through the lens of self-efficacy (Bandura, 1984), the teachers’ beliefs in their abilities to teach safety in agricultural mechanics will positively influenced their ability to provide safety instruction in the laboratory. Bandura (1997) posited a teacher’s self-efficacy can be enhanced by four sources (i.e., mastery learning experiences, physiological and emotional states, social persuasion, and vicarious experiences). The educational and professional experiences of the teachers indicate their engagement in these four sources of self-efficacy.

The teachers indication of being “moderately” to “very well prepared” to provide safety instruction stands in opposition the findings of previous studies which reported teachers lacked the necessary skills to instruct laboratory safety (Dyer & Andreasen, 1999; McKim & Saucier, 2011; Swan, 1992). Findings from the aforementioned studies indicated both in-service and pre-service teachers were inadequately prepared to provide safe instruction, which may indicate that a teacher’s experience may not have a large impact on their preparedness to teach safety. Dyer and Andreasen
Chumbley, Hainline, & Haynes attributed the teachers’ lack of preparedness to a “serious void” (p. 50) in teacher preparation. Moreover, Dyer and Andreasen (1999) indicated teachers were inattentive to safety laws (i.e., local, state and national) and incognizant of their ability to provide safe working environments in the laboratory. The present study failed to examine teachers’ knowledge of safety laws which could possibly represent an area of training need for the Texas agricultural science teachers. This area of safety instruction should be addressed in future studies which focus on agricultural science teachers’ preparedness to instruct safety.

In addition to the assessment of teachers’ perceived ability to provide safety instruction, this research study sought to determine the availability of selected safety equipment and emergency items in South Texas agricultural mechanics laboratories. It was determined that teachers had an extensive amount of safety equipment available for their use in the learning laboratory. Commonly used safety equipment such as industrial quality eye protection, welding gloves, and welding aprons were the most prevalent. In practice, safety materials utilized and discussed in the programs included the most prevalent safety equipment available to the programs, and additionally included fire extinguishers, properly marked exits, eye wash stations, as well as the use of properly marked safety exits. In support of this research, Chumbley (2015) and Lawver and Fraze (1995) found that eye protection was a safety topic commonly addressed as a high priority item in school-based agricultural mechanics programs. The teachers’ perceived ability to teach safety topics was related to the safety equipment and systems within their shops. For example, teachers which taught in laboratories without marked safety zones, safety posters, and fire blankets had little preparedness in teaching safety on those topics.

Regarding the approach to instruction of safety, those researched identified that materials utilized in the instruction of safety were likely to consist of hands-on safety materials (95.5%), videos (90%), worksheets (89.2%) and computer program (59.2%). This finding was consistent with findings in previous studies (Dyer & Andreasen, 1999; Lawver, 1992) which indicated that the most common instructional methods utilized to instruct safety consisted of classroom and laboratory demonstrations, student worksheets, and instructional videos.

Recommendations for Research

Additional research is needed targeting what barriers potentially exist with teachers using recommended safety practices in the instruction of agricultural mechanics. More so, cost of laboratory programs, equipment, and consumables (Saucier, Vincent & Anderson, 2014) continues to be a barrier behind inadequate instruction not only in content, but in safety practices associated with them. Research targeting solutions and their application should be further conducted.

It was identified through the findings that teachers felt “moderately” to “very well prepared” (94.92%) to provide safety instruction within their classes. In reference to the theory of planned behavior (Azjen, 1985), these findings shed light on the teachers’ perceived behavioral control in providing safety instruction, but fails to assess the teachers attitude toward the behavior and subjective norms associated with the behavior. These important factors, which have an influence on an individual’s intention to pursue an action, need to be assessed in this context. Montaño and Kasprzyk (2015) advocated the use of an integrated behavioral model to evaluate the planned behavior of individuals. The integrated model assesses four components which directly affect behavior, including: knowledge and skill in behavior performance, behavior salience, environmental constraints, and habitual behavior. Future research should focus on these aspects of behavioral intention to provide a deeper understanding on teachers’ intentions to implement safety procedures in agricultural mechanics laboratories.
Recommendations for Practice

Although teachers were “moderately” to “very well prepared” in regard to providing safety instruction overall, teachers indicated a lack of preparedness in certain aspects (i.e., safety zones, safety posters, and fire blankets) of safety instruction. While fire blankets many not be applicable in every shop situation, it is important the teachers consider the implementation of safety zones and safety posters to bolster the safety in their laboratories. Regarding safety zones, teachers should use OSHA as a resource to properly mark the equipment and work areas of their laboratories. The implementation of safety zones will serve two purposes, it will enhance the safety of the students in the school shop, while familiarizing them with safety colors used in future industry settings. Teachers can acquire safety posters online and from industry resources, but safety posters can also be developed by students, serving as a class activity.

Teacher educators, corporate entities (e.g., Lincoln Electric, Miller, Briggs and Stratton, Kohler, etc) and governmental entities (e.g., OSHA) can play an important role in providing teachers with safety training, in pre-service and in-service settings. The proposed agricultural mechanics safety trainings should focus on the areas in which teachers indicated the lowest level of perceived preparedness.

While the teachers felt prepared to instruct safety and maintain a safe working environment for students, the teachers’ shop safety preparedness should be perpetually evaluated. The burden of assessment falls on the shoulders of teacher educators (for pre-service teachers), school district administrators, CTE directors, and district safety inspectors (for in-service teachers). Dyer and Andreasen (1999) posited school administrators should actively monitor laboratory safety and assist in the procurement of needed safety equipment. The periodic inspections should evaluate the condition of the shop equipment, condition and availability of safety equipment, methods of safety instruction, and the scope of safety exams used in agricultural mechanics courses.

References


