Poster Session Proceedings

Southern Region Conference of the American Association for Agricultural Education

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San Antonio, TX

Sixty-eight posters were received with 32 in the innovative category and 36 in the research category. Seventeen innovative posters were accepted (53% acceptance rate). Eighteen posters accepted for research (50% acceptance rate).

Poster Reviewers

The following people generously and professionally donated their time to review poster abstracts. Without their commitment, the poster session would not be possible.

Name	Institution
Anderson, Ryan	Iowa State University
Byrd, Alex	Clemson University
Chumbley, Steven	Eastern New Mexico University
Deeds, Jacquelyn	Mississippi State University
Epps, Rebekah	The University of Kentucky
Estepp, Christopher	Sul Ross State University
Everett, M	Michigan State University
Frazier, David	Tarleton State University
Harbstreit, Steven	Kansas State University
Hock, Gaea	Mississippi State University
Jones, Wash	Prairie View A&M University
Lambert, Misty	Oregon State University
Lambeth, Jeanea	Pittsburg State University
LaVergne, Douglas	Texas A&M University - Commerce
Martin, Michael	Colorado State University

McCubbins, OP	Iowa State University
Meyers, Courtney	Texas Tech University
Myers, Brian	University of Florida
Newman, Michael	Mississippi State University
Osborne, Edward	University of Florida
Park, Travis	North Carolina State University
Paulsen, Thomas	Iowa State University
Perry, Dustin	Montana State University
Ramsey, Jon	Oklahoma State University
Roberts, Richie	Oklahoma State University
Shoulders, Catherine	University of Arkansas
Smalley, Scott	South Dakota State University
Stewart, Josh	Oregon State University
Strong, Robert	Texas A&M University
Thoron, Andrew	University of Florida
Vincent, Stacy	University of Kentucky
Warner, Wendy	North Carolina State University
Williams, Robert	Texas A&M University - Commerce
Zidon, Mark	University of Wisconsin - Platteville

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Research Posters

A Flicker of Light: Using Mobile Experiences to Educate Consumers about Energy Efficiency

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Introduction/Need for Innovation

In 2007, the United States Congress passed legislation calling for significant improvement in the efficiency of incandescent light bulbs beginning in 2012. A study by Di Maria, Ferreira, and Lazarova (2009) found that a major barrier to adoption of energy-conserving measures, such as more efficient light bulbs, was a "lack of awareness of benefits" (p. 13). Five years later, a study by Min et al. (2014) found that U.S. consumers were less likely to adopt energy efficient light bulbs as opposed to other energy efficient appliances and technology. Supporting this view, an examination of energy policy by Fuchs and Arentsen (2002) found that consumers lacked knowledge about electrical consumption and its associated effect on the environment. The National 25x'25 Agriculture/Forestry Steering Committee (2008) listed consumer education about renewable energy as one of its priority education needs, in addition to creation of curriculum for "incorporat[ing] energy concepts into instruction programs" (p. 59).

There is a need to create awareness in consumers about electricity consumption and renewable energy options. van't Hooft (2005) found that students perceive hands-on learning as more effective, and Johnson, Wardlow, and Franklin (1997) discovered that hands-on activities were associated with more positive attitudes toward science-centered subject matter. In an investigation of student awareness of biodiesel, Sallee, Edgar, and Johnson (2013) found that a demonstration method of instruction increased student interest in the lesson compared to a lecture. A hands-on demonstration of solar power and energy consumption may be useful in increasing consumers' awareness of renewable energy sources and energy usage.

How It Works

We developed the Mobile Energy Efficiency Manipulator to assist educators in engaging learners in experimentation and inquiry regarding energy efficiency (Figure 1).

Figure 1. Mobile Energy Efficiency Manipulator

The Mobile Energy Efficiency Manipulator uses a 320-watt solar array to power 14 lamp bases and two electrical outlets displayed on an artificial wall. Contrary to a wall in a home, the artificial wall will only supply electricity to loads that do not require more electricity than is being generated by the attached solar array. This static electricity source allows consumers to

experiment with the number of lightbulbs that can be powered by the array, very clearly displaying the difference in electrical loads required of incandescents, compact flourescents (CFLs), and light-emitting diodes (LEDs). As the learner flips on more light-switches, the bulbs begin to flicker or brown out when the load becomes greater than the solar energy input. The solar array does not have a battery backup system, which enables learners to experience the efficiency of renewable energy technology to convert solar energy in to electricity; as clouds block sunlight, the number of lightbulbs that can be powered changes rapidly.

Results to Date/Implications

The Mobile Energy Efficiency Manipulator was tested numerous times and proved successful at demonstrating energy use of all three types of light bulbs. We discovered that with clear, sunny conditions, the solar array was able to power a single 60-watt dimmable incandescent bulb and as more of the incandescent bulbs were switched on, every bulb dimmed. Eight CFLs were able to be powered; the eight working CFLs began to flicker and dim as more bulbs were turned on. It was discovered that non-dimmable LED bulbs were not well-suited to the purpose of the board as one or two of the bulbs would shut off completely as the power was distributed among all the loads. However, with dimmable LEDs, all 14 light bulbs would operate. The setup was used at a homesteader's conference and was well-received by learners, who used the board as a model for determining off-grid energy efficiency in their own homes.

Future Plans/Advice to Others

The development of the Mobile Energy Efficiency Manipulator proved to be a challenge, even for external renewable energy consultants. In order for solar energy, which is captured as direct current electricity to be converted to alternating current electricity, the unit required a solar micro-inverter, which, in available models, uses a battery. In our setup, the micro-inverter's battery would supply the artificial wall with additional electricity as the number of light bulbs turned on exceeded the supply from the solar array, causing the entire manipulator to fail in its purpose. We overcame this issue by collaborating with a graduate assistant specializing in Electrical Engineering, who was able to invent a battery-free micro-inverter specifically for use with the manipulator. We are currently in the process of constructing three more manipulators, which can be borrowed, free of charge, from the [University] [Renewable Energy Program]. Because these boards were both costly and challenging to construct, we recommend interested parties borrow one of the existing manipulators; however, we are happy to provide plans for the construction of the manipulators (excluding the micro-inverters, as they are patent-protected), should interested parties wish to construct the board themselves.

Costs/Resources Needed

The total cost for materials for one complete setup was approximately $1000. The solar panels used in this project were donated by the [University] Office for Sustainability, which may be an added cost for anyone wanting to replicate the manipulator. A complete list of resources and instructions will be provided to interested parties. Should interested parties wish to borrow an existing manipulator through the [University] [Renewable Energy Program], the only resources needed would be a cargo van and the time to transfer the manipulator to the desired location.

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A Picture's Worth a Thousand Words: Using Images to Stimulate Non-linguistic Reflection in College Agriculture Courses

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Introduction / Need for the Innovation or Idea

Researchers have long regarded reflection as a crucial part of the learning process (Boud, Keogh, & Walker, 2013); however, the mode of reflection can vary. While some students may prefer written reflections, others may prefer verbally reflecting in a classroom setting (Lamm, et al., 2011). Additionally, "one form of reflective practice may not fit the needs of all students" (Lamm, et al., 2011, p. 132). According to Lamm et al. (2011), it is most important that students are provided with reflection opportunities that "accommodate a variety of learning styles" (132).

Reflection through nonlinguistic representations (NR), which require students to process information by constructing images and then explaining those images to others, allows students to explore their perceptions and understanding about a concept without reliance on language (Marzano, 2010). While NR "may come in many forms" (Marzano, 2010, p. 84), students who reflect through NR generate greater brain activity, as they store knowledge both linguistically and visually (Bamalli, 2014). The positive impacts of NR on K-12 students' learning have been well documented (Haystead & Marzano, 2009), suggesting students of higher education may benefit from reflection using NR as well. We incorporated assignments requiring NR in a face-to-face undergraduate professional presentation course and an online graduate level research methods course to better understand how students in higher education settings carry out nonlinguistic reflection.

How it Works / Methodology / Steps

Students in Mississippi State University's undergraduate-level professional presentation course were asked to complete weekly visual reflection assignments during the fall of 2015. Students were first asked to answer a series of questions provoking them to think critically and connect the classroom content to their everyday life and future goals. Students were then asked to search for an image that represented how they interpreted the subject of each reflection assignment. In addition to providing an image with the reflection, the students were asked to provide an explanation as to why they selected the image they did. Students were assessed on their understanding of the depth and breadth of subject matter, how well the image conveyed the subject, and creativity.

Also during the Fall 2015 semester, students in the University of Arkansas' graduate-level, online research methods course were asked to complete weekly visual reflection assignments consisting of an image that portrayed how they felt about the week's content, modules, and readings, and a brief explanation detailing how the image displayed their feelings.

The instructors in both courses compiled students' images and used them to facilitate weekly class discussions. During these discussions, students were prompted to verbally explain their viewpoints on the particular subject and to discuss their fellow classmates' interpretations. Instructors utilized this discussion as an opportunity to build rapport among students, informally assess students' understanding of concepts, and address misconceptions as needed.

Results to Date / Implications

Within both courses, the visual reflection assignments encouraged students to think critically about the relationships between the content and their own lives. Students in both courses utilized the assignment to display their feelings regarding the requirements of the course and their interpretations of the content (Figure 1).

Figure 1. Students' nonlinguistic representations of emotions and understanding of content.

Students' explanations of feelings-based images enabled them to clearly define and manage their emotions regarding the course and allowed instructors to provide individualized student support throughout the duration of the course. For example, the graduate student providing the emotional representation in Figure 1 stated, "The cave diver…is how I feel currently, because at the beginning of the dive you could still see light into the cave (class), but now that I'm in I feel that I'm going in circles especially with [the assignment]". Students' explanations of content-based images allowed them to analyze the content in relation to other objects and concepts in life and allowed instructors to regularly, yet informally, assess students' understanding. For example, the undergraduate student providing the content-based representation in Figure 1 "chose Windex… because it cleans windows. When Windex cleans windows it provides clarity. When a presenter gives a presentation it should provide clarity on the subject like Windex does to windows".

Future Plans / Advice to Others

This assignment will continue to be used in both classes in future semesters, as we observed positive impacts on students' understanding of the course material and management of emotions related to the course. Additionally, our ability to monitor and respond to students' needs for individualized support over time enhanced student-instructor relationships in both courses, but was especially impactful in the online course, where student-instructor interaction is otherwise limited. We did, however, observe differences in students' expectations regarding the assignment; undergraduate students were initially overwhelmed with the frequency of the reflections. We advise instructors to regularly encourage undergraduate students to think creatively and critically analyze concepts covered each week. Graduate students viewed the assignment as a less intimidating piece of their weekly modules, and welcomed the assignments almost as a respite each week. We recommend graduate-level instructors engage in supportive dialogue during discussions and individual contacts in order to maintain the ease with which graduate students openly share their nonverbal representations and accompanying thoughts.

Costs / Resources Needed

All resources required to implement nonlinguistic reflection, including electronic assignment platforms and internet access, are commonly available within institutions of higher education. While no direct monetary costs were incurred with this innovation, instructors should consider the opportunity cost when introducing a new assignment. Students must invest time to think critically and creatively when selecting and explaining images. In addition, the instructor must devote a portion of his or her class time to reflective discussion. However, the benefits this innovation brought to our courses suggest its implementation is worth the necessary time.

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An Authentic Approach to Preservice Teacher SAE Instruction (Phase II)

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Introduction

Supervised agricultural experience (SAE) has been an integral component of school-based agricultural education (SBAE) since 1908, as a way to offer students a hands-on, contextual approach to complement classroom learning (Croom, 2008). Decades later, the philosophy of SAE still remains essential to the total SBAE model as reported by both teachers and students (Camp, Clarke, & Fallon, 2000). However, SAE also claims the responsibility of offering high stress and difficulty for teachers when it comes to managing implementation and supervision of student SAEs (Wilson & Moore, 2007). Preservice teachers themselves also echo their fears in regards to SAE implementation and supervision prior to entering the classroom. Johnson, Lindhardt and Stewart (1989) reported that first and second year teachers prioritized managing student SAE projects as the third most important component of their program. Stair, Warner, and Moore (2012) identified developing and managing SAE programs as a top concern of pre-service and in-service teachers, ranking higher than class preparation and time management. Out of ten agricultural teacher education programs selected for research done by McLean and Camp (2000), all ten programs were reported to have taught the topic of SAE in their teacher preparation programs. Out of these ten programs, three reported having specific classes dedicated to preparing pre-service teachers in the planning and implementation of student SAE (McLean & Camp, 2000). More recently, Rubenstein, Thoron and Estepp (2014) reported that a majority of the 92 preservice teachers received instruction from at least one course, while nearly a tenth of the respondents reported no instruction on SAE within their teacher education program. Furthermore, Rubenstein (2014) recommended all agriculture teacher preparation programs engage preservice teachers in an SAE program. Therefore, the teacher preparation program at the University of [State] designed intensive and experiential SAE course work for preservice teachers.

How it Works

In previous years, the utilization of a team approach to SAE program development and implementation had been utilized at the University of [State]. However, the researcher noticed a lack of full student participation due to a lack of individual investment in the SAE program. Therefore, following the previous utilization of this learning activity the instructor requested feedback from students, which lead to the redevelopment of the SAE programmatic assignments.

Fourth year agricultural education preservice teachers were required to complete the Developing Community Programs in Agriculture course during the fall semester before student teaching. A main objective of this course was for the learner to be able to develop, implement and supervise SAE programs. In line with this objective, a main course project was the development and implementation of an authentic SAE program that would be conducted throughout the semester. SAE programs were developed during the first two weeks of instruction and students began keeping records through the Agricultural Experience Tracker (AET) program.

To assist in the development of an SAE programs, students utilize the SAE Dichotomous Key (Rubenstein & Thoron, 2012) during a regular class session. By the following class, students were required to submit an SAE topic to the instructor for approval. Throughout the semester, students were required to engage in tasks associated with their SAE on a regular basis. Each student was required to maintain accurate and upto-date records of their SAE program utilizing the AET program. The records were to be updated on a weekly basis and were observed by the

instructor each Friday. Roughly once a month the preservice teachers engaged in an in-class discussion, where the instructor modeled appropriate in-class supervision techniques. Furthermore, students were engaged in providing peers with authentic in-class supervision during classroom instructional time. At the end of the course, students' were required to create a display that reported their SAE experience. Students were given three to five minutes to describe their SAE program, the learning that occurred, modifications the student would make for future years, and how this experiences influenced their SAE philosophy. Furthermore, each student was required to complete a proficiency application most appropriate for his or her SAE topic area. On the last day of class, students engaged in reviewing other student's proficiency applications utilizing the National FFA Proficiency Rubrics.

Results to Date/Implication

Anecdotal evidence collected by the investigators indicated that preservice teachers who engage in authentic SAE experiences during the teacher preparation program were better prepared to develop and implement SAE programs in middle and high school classrooms. Following the class, several student participants noted that their engagement in an SAE program during the preservice program was one of the most beneficial experiences of their college career. Preservice teachers noted they were better prepared to deal with student issues and to balance time concerns that agriculture teachers have in regards to SAE utilization. Furthermore, preservice teachers noted their participation in an SAE program reinforced the need for SAE to be an integral component in their future SBAE programs.

Future Plans/Advice to Others

When incorporating an SAE program in a preservice teacher preparation programs, the investigators recommend emphasizing the importance of SAE in the total SBAE program. Furthermore, the investigators recommend developing an expectation for all students to be engaged in an SAE during their core agricultural education coursework, thereby developing a culture for SAE in the preservice teacher preparation program. Finally, preservice teachers should engage in the SAE program as both a student and teacher. When conducting the SAE program preservice teachers engage as a student, while at other points during the course preservice teachers were expected to practice supervision skills with other students in the class.

Cost/Resources Needed

There were no costs required to incorporate an authentic SAE program in the agricultural education core courses. However, the investigator recommends the utilization of the SAE Dichotomous Key as a teaching tool to assist preservice teachers in the development and implementation processes. Thus, preservice teachers have training to utilize the SAE Dichotomous Key in their future SBAE programs. Finally, an online or paper-based record keeping system must be utilized to ensure that students engage in as authentic of an experience as possible.

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Attracting the Next Generation of School Based Agricultural Education Instructors: An Approach to Recruitment

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Introduction

The lack of supply and filling the demand for Agricultural Education teachers is not a new concept (Kantrovich, 2010, p 6). For nearly 100 years, the teacher shortage in agricultural education has been lingering in the minds of those in the profession (Camp, 2000). The shortage has lead to the ultimate question "how does the agricultural education profession recruit enough qualified people into teaching to fill the need of the profession for replacement teachers" (Kantrovich, 2010, p 7)?

Recruitment strategies in the Department of Agricultural Education, Communications and Leadership at Oklahoma State University (OSU) rely on two approaches (passive and active) for promoting agricultural education as a college major and career choice. The active strategies consist of highly visible programs that include faculty and graduate students working with teachers, parents and students to highlight the positive attributes of the profession. Reis and Kahler (1997) reported, "parents and agriculture teachers play the biggest role in determining whether or not students enroll in agriculture programs at college" (p.44). Regarding the passive approach to recruitment, Calvin and Pense (2013) advise the implementation of "better designed, interactive web pages used by potential recruits and their parents to make decisions regarding fit with the program" (p. 54). To that end, attention to webpages, consistent, timely correspondence and static displays in the department compose the passive strategies that represent the more subtle recruitment activities.

How it Works

The Department of Agricultural Education, Communications and Leadership at Oklahoma State University uses an array of programs developed to recruit potential agricultural education students. Recruitment strategies are designed to attract students at both the secondary and postsecondary level, and highlight agricultural education as a viable college major and career choice. Recruiting students within the college can be problematic due to perceived "departmental turf" or the attachment students have to their current departments. This abstract focuses on strategies employed at the college level, specifically the College of Agricultural Science and Natural Resources (CASNR) Career Fair, and the secondary level, the Future Agricultural Education Teaching Academy (Ag-Ed Academy). The CASNR Career Fair offers a professional atmosphere for students to seek out potential agricultural career opportunities. This year, a faculty member and graduate student reserved booth space and created a static display representing the National Association of Agricultural Education (NAAE) Region II. The booth hosted Oklahoma school-based agricultural education teachers, state staff, and Ag-Ed faculty and graduate students. CASNR Career Fair attendees had access to experts on Oklahoma agricultural education and received the most recent information concerning job responsibilities, demand for teachers and opportunities across the state. The Ag-Ed Academy focuses on secondary students with an interest in agricultural education as a college major and career choice. Participants are given the opportunity to teach selected agricultural literacy lessons and interact with current agricultural education stakeholders. This recruitment activity is a result of a cooperative effort between the Oklahoma Department of Career and Technology Education, Agriculture Division, Oklahoma Agricultural Education Teachers Association and the agricultural education faculty at OSU. Teachers nominate their students and assist with the application process and staff members assist with the selection process, while faculty design and deliver the weeklong

program on the campus of OSU. Passive recruiting strategies are also implemented and include e-mail listservs, newsletters, and targeted mailings to prospective students. Additionally, social media sites are utilized to recruit students into the agricultural education program.

Results to Date/Implications

These strategies have been effective in bringing students to the agricultural education major and ultimately the profession of teaching. The CASNR Career Fair resulted in fifty contacts with students that represented all nine majors within CASNR. These contacts will be added to the database and passive recruitment strategies will be used to further inform them about the available opportunities in the profession. The Ag-Ed Academy has been in place since 2007 and, consequently, 135 students have been introduced to agricultural education via the Ag-Ed Academy. Of those students, 27 are currently teaching agricultural education. Currently the database for prospective students receives a bi-annual mailing to correspond with admission and orientation/enrollment deadlines that are set by the university.

Future Plans/Advice to Others

The Ag-Ed Academy has been successful in recruiting students in to the agricultural education program to fill the shoes of those in the school-based agricultural education setting. The department will continue to provide this opportunity to those students who meet the requirements. Additionally, in order to receive grant funds and assistance in developing a sustainable plan for school-based agricultural educator recruitment and retention, OSU intends to work with other teacher education institutions in a state-wide effort to join the National Teach Ag State Teach Ag Results (STAR) Campaign.

Cost

The cost for participating in the CASNR Career Fair is approximately $250.00. This reflects the cost of the booth rental and printing and duplicating. The Ag-Ed Academy requires a budget of $10,000.00 to conduct the weeklong event. The budget includes on-campus housing, transportation, meals and consumable supplies. The Oklahoma Department of Career and Technology Education provides funds for teacher mentors and Ag-Ed Interns, additional sponsors provided resources for scholarships awarded to students that complete the Ag-Ed Academy, enroll at OSU and select agricultural education as their college major.

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Bringing Data to Life through Experiential Learning

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Introduction/need for innovation or idea

There is little doubt that one of the key elements in effective education is student engagement (Witt, Ulmer, Brashears & Hurley, 2014). Numerous studies have shown the value of high quality educational experiences that engage multiple senses and result in higher achievement, longer retention, and greater levels of student satisfaction (Parr, Edwards, & Leising, 2006, 2009; Pearson, Young, & Richardson, 2013). Further, it is widely accepted that students' learning contexts should be coupled with multiple opportunities in which they "construct" or make meaning of their learning as it begins, progresses, and escalates. (Doolittle and Camp, 1999) Agricultural Education has long been recognized for providing students with a contextual application of scientific principles that has shown to have a positive influence on student performance. However, there are various aspects associated with the agricultural education curriculum that have been more challenging than others to implement experiential learning opportunities. There are various agricultural business aspects that may not seem at first consideration to be activity and experience rich, however, a carefully designed and implemented activity has been very beneficial to several agricultural education students at Murray State University.

How it works/methodology/program phases/steps

Many theoretical concepts in agricultural economics require students to identify relationships between variables. These relationships can be expressed in one of four ways: with spoken or written words; with charts, tables or schedules; with graphs; and/or through mathematical expression. In order to fully grasp economic concepts students should master each method of identifying relationships. Emphasis in introductory agricultural economics courses are often placed on the graphing method as this is a "tool" that many students can use to quickly interpret real-world market situations.

In order to help students use graphs to identify relationships between economic variables students in an introductory agricultural economics class are given multiple opportunities to identify with the material. Initially students are assigned to review an overview of the topic in their textbook and the instructor then leads a brief discussion to review the key components of the concepts. After the discussion, students are split into groups to participate in an active learning experience. Finally, the students are assigned an applicable problem to solve on their own to provide evidence of their mastery. The focus of this innovative idea is the aforementioned active learning experience.

For the active learning experience four to five Cartesian coordinate planes have been taped to the floor of the classroom with painters tape. Only the first quadrant of the plane has been taped, usually in a 54"x54" space. Upon arrival to class students are informed they will become human graph coordinates at some point during the class. Each student is given a colored index card with four to five lines of data written on the card and told they will need to use them to determine an economic relationship during class. Students are then split into multiple groups of 3-14 based on the color of the index card they received.
An example of data included on one set of index cards would be for the U.S. beef industry, published by the Economic Research Service of the United States Department of Agriculture. Each card could include a year, the U.S. beef consumption (in billions of pounds) for that year, and the average beef price per pound that year. Including multiple variables on each card allows

each group to determine which variables they will use to design their graph, providing for different types of graphs in the lesson.

Each group of students is directed to one of the Cartesian coordinate planes and given two packets of colored sticky notes to use to graph their data. Student groups are given 25-30 minutes to interpret their data and design a time series, cross section, or scatter plot graph. Each group must identify the independent and dependent variables they will use. Then they must design the axis, scale, plot the coordinates, and title the graph. Each group must calculate the slope of their graph, determine the directional relationship between the variables and determine if their graphs represent macroeconomic or microeconomic studies. At the conclusion of the time students in each group are orally quizzed to determine how the group completed the activity and what they could have done differently to design a different graph.

Results to date/implications

The results for this active learning experience are anecdotal but very positive concerning student perceptions and student comprehension. The students thoroughly enjoy the opportunity to become actively involved in this series of lessons as they physically and mentally engage in the problem-solving skills that these exercises require. This activity ushers students through the complete cycle of Kolb's (1984) experiential learning cycle from the concrete experience of becoming a human data point to the reflection of the exercise and transfer of knowledge into new situations. Students tend to perform well on written exams concerning these principles and regularly mention these experiences during course evaluations and in classroom conversation. The student to student interaction observed during these exercises reveal a high level of peer interaction that is consistent with the values associated with social constructivism as espoused by Vygotsky (1978). It is apparent that the level of cognitive discourse is more readily navigated for some students who naturally become mentors to those that are struggling with the concepts. This allows the instructor the freedom to move about the group to facilitate discussion and to help students remained focus on the activity.

Future plans/advice to others

These activities will continue and other avenues for experiential learning will continue to be explored. An evolution of this activity would be to give each group two sets of complementary data cards. This would allow for the graphing and discussion of more complex relationships. In the future, students may also be asked to explore current price and production trends in agricultural markets to develop their own data sets to incorporate in the activities.

Costs/resources needed

This active learning exercise has minimal total cost to implement. Direct supply costs include 1-2 rolls of painters tape (for easy application and removal of the coordinate systems), two different colors of sticky pads (each team needs at least two colors), and different colors of 3"x5" index cards. Indirect costs include adequate floor space to graph multiple coordinate systems, internet access for data collection and instructor time to determine appropriate data for each group of index cards.

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Discovering What Lies Beneath: Utilizing Ultrasonic Testing for the Evaluation of Welds in Secondary Schools

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Introduction

The key to humanity's challenges lie within science, engineering, and technology since it permeates most facets of life (National Research Council, 2012). The understanding of science and technology is essential more now than ever. With this change of focus has been followed by calls for improvements in k-12 schools to maintain global competiveness within Science, Technology, Engineering and Mathematics (STEM) (Carnevale, Smith, & Melton, 2011; Chumbley, Haynes, & Stofer, 2015). However, STEM education still needs improvement to continue to strive for this goal (National Research Council, 2012).

STEM education and agricultural education have similar philosophical underpinnings (Stubbs & Myers, 2015). The similarities include connecting content knowledge, STEM knowledge, real-world issues, problem solving skills, and including hands-on activities (Ejiwale, 2012; Stubbs & Myers, 2015). Since the conception of STEM education research on science and mathematics integration has been prevalent with less research focusing on the integration of technology (Coppola & Mayln-Smith, 2006; Stubbs & Myers, 2015). However, technology integration presents an opportunity to providing alternative and innovative approaches to teaching learning, which can allow students to meet higher standards and perform at higher levels (Kotrlik, Redmann, & Douglas, 2003).

One critical component agricultural education that has been a vehicle to integrate STEM education is agricultural mechanics (Pate, Warnick, & Meyers, 2012). Agricultural mechanics holds the ability to teach technical hands-on applications along with integrating science, new technologies, engineering, and mathematics as industry changes (Pate, Warnkick, & Meyers, 2015). Within agricultural mechanics there are a plethora of topics areas that could be taught such as small engines, electricity, plumbing, carpentry, and welding to name a few. Numerous studies have been conducted regarding agricultural education teachers and their professional development needs in agricultural mechanics (Byrd, Anderson, Paulsen, & Shultz, 2015; Lester, 2012; McKim, Saucier, & Reynolds, 2010; Peake, Duncan, Rickets, 2007; Saucier & McKim, 2010). One area these studies have found that a majority of agricultural educators teach is metal fabrication and welding.

Welding in a traditional agricultural education are based on American Welding Society (AWS) standards, which is one of the industries well known authorities (AWS, 2015). According to AWS (2015) besides becoming a welder, individuals came learn to be a welding engineer, welding supervisor, welding inspector, or welding educator to name a few. One commonality between these positions is that each has to know how to inspect a weld (AWS, 2015). This is an area that can be difficult to teach and learn, but with today's technologies welds can be inspected in a non-destructive way by using ultrasonic testing (Bowditch, Bowditch, & Bowditch, 2010). Ultrasonic inspection devices are very portable and easy to use, so could the incorporation of ultrasonic inspection increase student achievement in this area?

How it works/Methodology

An ultrasonic testing device, such as the EPOCH 650 UT flaw detector, uses high frequency (100 KHz – 25 MHz+) sound waves to identify internal flaws in a solid material (Marks, 2015). The time it takes for the sound waves to hit the front surface, any flaw, and back surface of a test object and reflect back in the form of an echo to the unit is used to identify flaws and gauge

thickness (Marks, 2015). Most ultrasonic devices utilize a piezoelectric crystal to create the sound waves. The sound waves are generated by applying a voltage to the piezoelectric crystal which make the crystal distort, and once voltage is taken away the crystal vibrates (Marks, 2015). Once the echo returns and hits the crystal, the crystal changes the vibrations into voltage which is recorded by the machine (Marks, 2015). The amplitude of the echo and depth to the echo will help identify any internal flaws that might be present in a test object. This instrument will help prepare students interested in the welding profession for industry requirements in relation to weld inspection and expose them to the science used to do it.

Implications

The utilization of ultrasonic testing of welds can help educators teach students to properly inspect welds through non-destructive means. Please note that we recommend this as a teaching aid and inspection tool for weld integrity, but it requires a certified technician to interpret the data. This technology may also attract non-traditional students to try welding and explore the associate careers tied to the industry. Cradler, McNabb, Freeman, and Burchett (2002) posited that the integration of technology can lead to critical thinking skills, higher skill achievement, and preparation for today's workforce.

Future Plans

Ultrasonic testing is currently being used in a select number of schools through the Cost-effective RollOver Protective Structure (CROPS) curriculum research study coordinated by the [UNIVERSITY] designed to investigate the structural integrity of farm safety equipment that secondary agriculture students are constructing. The CROPS project helps secondary agricultural education programs build a CROPS project that is fabricated and built from steel. These CROPS projects are inspected before being installed on tractor within the school's community. Utilizing a certified ultrasonic testing technician, CROPS projects produced are inspected for weld quality and integrity. The technician also explains the process of how ultrasonic testing works and how to interpret the displayed data.

Cost/Resources Needed

The largest expense is the purchasing of an ultrasonic testing device. The one used for the upcoming project costs approximately $6,000. There are different levels of ultrasonic testing devices that are cheaper. Two training courses may be required which cost a total of $1600. The other expense is the purchase of couplant, a gel like medium to help transfer sound waves into the test object much like that used when doctors conduct ultrasounds. The costs varies based on the properties of couplant but can be as cheap as $14.00. Depending on the type of inspection you are wanting to conduct the purchasing of transducer blocks may be necessary. The total budget needed to start would be approximately $7,600.00.

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EDTHENA – Creating a Community of Reflective Teachers

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Introduction/Need for Innovation or Idea

While student teaching is an experience that is meant to be pivotal in terms of its pedagogic value, it has been noted that some experiences can also be *miseducative* (Dewey, 1938). At Oklahoma State University, each pre-service teacher is placed in the best program for his or her particular needs. Currently, the average, round-trip commute per student teacher visit is approximately six hours or 300 miles. Given that the Oklahoma State University teacher preparation program yields an average of 35 secondary educators each year and is limited in its number of teacher educating faculty members, each student teacher is only visited twice over the course of their 16-week experience. As such, pre-service teachers are limited in the quantity and quality of feedback they receive while student teaching. A need, therefore, existed to increase the frequency and caliber of feedback provided to pre-service teachers during their student teaching experience.

Some researchers (Kolb, Kolb, Passarelli, & Sharma, 2014) have suggested that assuming a coaching role can better facilitate constructive feedback. Consequently, many pre-service teachers and teacher educators may ask: How can we assume this role? Oklahoma State University has attempted to answer this challenge by adopting EDTHENA, a web-based platform that allows pre-service teachers to upload video recordings of their instructional practices for reflection, support, and peer and instructor feedback.

How it Works/Methodology/Program Phases/Steps

EDTHENA works to help student teachers analyze their instructional practices through the use of classroom video and online communities of practice. To begin, a student teacher records one of their lessons using any video capable device and uploads the video using the EDTHENA Video Tool. At this point, the student teacher may add descriptive information to the video and attach supplementary files, such as lesson plans, assessments, and visuals. The video is then posted to the student teacher's EDTHENA profile and shared with the student teaching instructors and cohort. To target and highlight specific instructional skills, instructors may create and assign *Explorations*. Additionally, groups are formed among the student teaching cohort in order to facilitate peer and instructor feedback on *Explorations*. Feedback may be tagged and provided in the form of questions, suggestions, strengths, or notes. Through the implementation of EDTHENA, instructors are better able to facilitate pre-service teachers' mastery of key teaching methods and classroom management strategies from afar.

One of the explorations utilized in a teaching methods course required that students complete the following:

1. Upload an 8-minute section of video highlighting effective questioning during the problem-solving microteaching session.
2. Upload the accompanying lesson plan as an artifact of the lesson.
3. Provide at least five elements of feedback on your personal video.
4. View the teaching video of two assigned classmates, and provide at least five elements of feedback related to questioning strategies.
5. Assess your own video using the teaching skills rubric embedded in the exploration.

6. Complete an overall reflection of the selected video and demonstration of effective questioning.
7. Submit the exploration to your coach for feedback and assessment.

Results to Date/Implications

Currently, 42 Oklahoma State University pre-service teachers are utilizing EDTHENA for purposes of instructional reflection and improvement. In only three months, these students have collectively uploaded and shared more than 100 videos. In total, these videos have facilitated over 500 instances of peer feedback and more than 100 instances of instructor feedback. Additionally, in reviewing and reflecting on their own instructional practices, teacher candidates have provided approximately 500 accounts of self-reflecting commentary.

Future Plans/Advice to Others

Oklahoma State University plans to continue utilizing EDTHENA to increase the quantity and quality of teaching feedback opportunities. Ideally, this technology will be integrated into additional agricultural education courses to provide more opportunities for exposure to instructional feedback and reflection. In the upcoming Spring semester, Oklahoma State University aims to use EDTHENA to include cooperating teachers more fully in the education of student teachers by including them in the online feedback process. Oklahoma State University strongly encourages the use of EDTHENA to other universities seeking to increase instructional feedback and efficacy among student teachers. A solid understanding of the program and a clear plan for implementation are highly recommended in order to maximize the efficiency of EDTHENA. One primary recommendation is to realize that EDTHENA is based on the assessment of teaching skills and behaviors rather than the assessment of an entire lesson. This paradigm shift required minor revisions to the objectives and schedule of the course, but brought about very powerful assessment and coaching opportunities. EDTHENA encourages each institution to provide a list of skills or competencies that are uploaded to the platform to facilitate feedback and assessment unique to the institution.

Costs/Resources Needed

In making EDTHENA a course requirement, students are now expected to purchase a subscription in order to satisfy this expectation. As student teaching already had a laboratory fee in place, incorporation of this expense into the preexisting course fee was relatively simple. EDTHENA does not publish a general cost or rate, but would rather work with each institution to create a custom price based on the program needs. As a policy, they discourage any publishing of specific prices, and as such, we complied with that request. EDTHENA shared that the cost per student is close to that of a standard textbook for a college course. A license is purchased for each student that can span one full year or a semester. The teacher education program must also have a means to record standard video, a means to store and transfer those video files to students, and an internet connection that supports the streaming capability of the EDTHENA platform. An iPhone application is currently in development that would allow recording from a personal device directly into the EDTHENA system eliminating the need for file transfer.

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Engaging Participation in the Instant Communication Era

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Introduction/Need for Innovation

We live in an era where technology is available to everyone and people multitask with the excuse of saving time (Weimer, 2012). For instance, the use of cell phones and subscriptions increased almost four times since 2004. Likewise internet access continues to increase steadily over the years (Telecommunication Development Sector, 2014). At this point in time, cell phones are no longer considered a new idea and the access to internet is closely following the same trend; allowing people to multitask using their cell phones (Rosen, 2008). Several studies have shown that multitasking reduces productivity when it comes to learning environments (Weimer, 2012). A neuroimaging study found in 2006 that multitasking and the use of cell phones is not related to the amount of information absorbed, but it affects people's ease to apply knowledge gained to real situations (Foerde, Knowlton & Poldrack, 2006).

Houle's typology of learning orientations explains that adult learners' motivations to participate and engage in educational activities are defined by three orientations: "Goal-oriented learners, those who use education as a mean of achieving some other goal; activity-oriented learners, those who participate of the activity itself and the social interaction; and learning-oriented participants, those who seek knowledge for its own sake" (Merriam, et al., 2012, p. 64). Therefore, according to Houle's typology whenever a person participates in activities, such as professional development conferences, the individual must hold an orientation to participate in the activity. However, daily activities demand people to multitask and they can easily get distracted in their professional development activities. The National Research Agenda of the American Association for Agricultural Education (AAAE) highlights the importance of creating meaningful learning environments and the need to have engaged learners (Doerfert, 2011). This innovative idea aims to maintain adult participants actively engage in a professional development activity using instant communication technology.

How it Works

Researchers evaluated multiple online platforms for instant communication available to the public in the World Wide Web (WWW), in order to promote an interactive participation between the audience and presenters at a professional development conference, held in Panama City by the International Center for Food Industry Excellence (ICFIE) from Texas Tech University. The basic subscription to the Sli.do platform was decided to used based on the following advantages: user friendly, participants do not need to register, participants do not need to download an app, participants can vote for their favorite questions, moderator can highlight questions and hide the ones that have been discussed, and no maximum limit for participation and amount of participants. At the beginning of the conference, presenters explained to the audience how to use the platform. Participants could comment or ask questions during the conference and also vote for the questions they considered most important.

Results to Date/Implications

The experimental use of an online platform on a professional development conference was considered successful. Participants actively engaged throughout the conference period, minimizing their potential desire to multitask, and increasing the amount of absorbed information, as suggested by Foerde, Knowlton and Poldrack in 2006.

The conference had an estimated audience of 80 participants. During the conference, the platform had a total of 46 participations, 31 were questions from the public and 15 were answers from

experts. Many questions were anonymous, only 26% of the participations were submitted using the participant given name. The audience whom participated could be considered innovators and early adopters. At the end of the conference, participants who were not able to use the online communication tool, had the opportunity to ask questions to the presenters through a questions and answers (Q/A) session. These participants were considered by the researchers to be part of the early majority, late majority, and laggards, based on Rogers Diffusion of Innovations Theory (2003). Presenters of the conference were comfortable with the tool due to its innovative characteristics that can potentially reduce time during Q/A sessions.

Future plans/Advice to others

Future professional development activities in the U.S. and Latin America conducted by ICFIE will incorporate the use of an online platform to actively engage participants with presenters. This will facilitate Q/A sessions at conferences, as presenters will have certainty on the audience doubts and effectively expand in areas where information may have not been clear for the participants.

Presenters intending to use this kind of online platform should be familiarized with the platform before the training process or class period. This in order to effectively use the platform, to direct the audience on the "how-to" throughout the sessions, and make the Q/A sessions as efficient as possible.

Costs/Resources needed

The resources needed to implement an online platform in a professional development activity are: at least one desk-computer or laptop, projector, one tablet or laptop to manage the interphase between participants and presenters (moderator), and internet connection for every device in the event, whether it is through mobile data or a Wi-Fi connection.

The cost to implement an online platform in any given event will vary according to the desire level of interaction. Most platforms provide free and paid subscription plans. Free subscriptions allows participants and presenters to post questions and/or comment, while paid subscriptions facilitate connectivity to social media, export data, and online technical support.

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Establishing a Crowdfunding Sustainability Project for Resource-Depleted Secondary Agricultural Education Programs

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Introduction/Need for Innovation or Idea

One approach for implementing safety practices among youth is through experiential, service-led projects, since previous attempts at teaching farm safety practices to adults have been deemed ineffective (Ambe, Bruening, & Murphy, 1994; Carrabba, Jr., Talbert, Field, & Tormoehlen, 2001; Goldcamp, Hendricks, & Myers, 2003). According to Shoulders, Blythe, and Myers (2013) extending ownership in laboratory activities is the most important lesson-based attribute. An attempt is being made to reduce the number of farm youth injuries and fatalities in high injury-prone communities through the implementation of Cost-effective Rollover Protective Structures (CROPS).

While student led projects are effective at giving students ownership and pride in learning, the projects are costly. For poverty stricken schools to support this program there needs to be some form of income generated in order to provide sustainability of CROPS for instruction in future years. Boone and Boone (2007) discovered that barriers such as school budget cuts, lack of funding, or lack of administrative financial support hindered agriculture teachers from implemented valuable educational projects.

How it Works/Methodology

The rise in popularity of crowdfunding, a social media platform, allows people to build and raise awareness to a campaign and provides project creators the opportunity to fulfill their fundraising needs in new ways. Crowdfunding is defined as a growing social media trend in which project creators request financial donations from various contributors who help realize a new project, idea, or product (Belleflamme, Lambert, & Schwienbacher, 2011; Wash, 2013). In some ways, crowdfunding almost always benefits the public (Wash, 2013), and in this case, it is constructed rollover bars provided to poverty-stricken farmers through the local agricultural education program.

The public is able to view campaigns and donate a small amount of money to be used toward the project. A project is defined by Wash (2013) as a "well-defined set of tasks that need to be accomplished." Oftentimes, projects with clear goals, specific needs, and a defined end date are more successful at raising money than projects without clear objectives (Wash, 2013).

Most often, family members and friends of project creators who are involved in the project are the most likely to donate. Crowdfunding is less about raising large amounts of money from a few investors, and rather, more about raising small donations from a large group of people, "the crowd" (Belleflamme et al., 2011; Wash, 2013). One reason crowdfunding is so successful is due to the "feel good" or philanthropy attached to donating (Belleflamme et al., 2011; Gerber, Hui, & Kuo, 2012; Wash, 2013). Belleflamme et al. (2011) states that crowdfunding produces the same amount of funds as if you were to seek funds from a bank, but what compels the public to donate to a crowdfunded project is the perceived benefit to what is being created. The combination of agricultural education programs and community citizens allows the project to fall under priority areas two and six of AAAE's National Research Agenda (Doerfert, 2011).

Results to Date/Implications

To date, the authors received a feasibility grant to develop a curriculum crowdfunding module during the current academic school year (2014-2015). Upon completion of the academic school year, a select group of secondary agriculture teachers in rural poverty stricken, Appalachian communities in Kentucky, Tennessee, and North Carolina received a curriculum module that began with a crowdfunding start-up package. The crowdfunding began generating funds throughout the 2015-2016 academic school year. The crowdfunding campaign assists in the sustainability of the project and curriculum. A Twitter hash tag and Facebook page assists the tracking of total funding generated. The local agriculture teacher and the participating postsecondary agricultural education program monitor each crowdfunding site. To date, the selected schools have generated over $10,000 toward the sustainability of the curricula project. In July, the project received top honors for innovation by the National Institute for Occupational Safety and Health; a division of the Center for Disease Control in Washington, DC.

Future Plans/Advice to Others

It is anticipated that the crowdfunding component will generate $18,000 for these resource-depleted agriculture programs in order to provide two CROPS per community per year. The success of the project has generated national attention and the overall curriculum project, which includes the crowdfunding component, is one of seven finalists for $1.25 million dollars to expand the project throughout the entire Southeastern region of the United States. A department of communications is examining the best practices of the current crowdfunding project and the impact the project has upon a community. These results will assist the researchers in identifying new steps in the overall development of the project.

Cost/Resources Needed

One of the primary benefits of constructing a CROPS rather than purchasing one from a dealer is the less expensive cost. To build homemade CROPS from the National Institute of Occupational Safety and Health (NIOSH) approved plans, it will cost roughly $626.41. The cost of construction materials equate to $387.66 with an additional $238.75 to supply a new seat and seatbelt. When schools are part of the project, they are funded through a grant from the Educational Opportunity Program. After the school year concludes, schools are no longer funded through the grant. However, the teachers are welcome to continue using CROPS curriculum as a tractor safety education component and service-learning project.

Schools are provided with a list of materials, as well as information on where to purchase the materials. The crowdfunding sites that are part of the crowdfunding packet are GoFundMe.com, Kickstarter.com, and DonorsChoose.org. GoFundMe and Kickstarter are popular, well known, and successful crowdfunding sites. DonorsChoose is an organization specifically geared toward K-12 teachers whose campaign is designed around projects, purchasing class equipment, or field trips.

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Graduate Student Entrepreneurship: Answering the Professional Development Needs of Secondary Agriculture Teachers

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Introduction

Within a university, graduate students serve several important roles (Dodson, Fernyhough, & Hollman, 2006). Their roles may include serving as a teaching assistant, research assistant, committee member, supervise student teachers, and advise undergraduate students. In addition to their primary responsibilities; graduate students are expected to participate in professional development activities. Within agricultural education, professional development activities that graduate students actively participate in are research conferences. At a research conference, graduate students are typically engaged in oral presentations, poster presentations and serve as research session facilitators.

In order for graduate students to participate in research conferences they must register for the conference, reserve a hotel room, and find transportation. For agricultural education research conferences, graduate students are given a reduced rate for conference registration. However, hotel accommodations and transportation do not have reduced rates for graduate students. According to Barrick, Clark, and Blaschek (2006) one of the responsibilities of a faculty mentor is to help graduate students find funding for their studies. Funding can come from grant opportunities or university resources. However, if those funds are exhausted how can a graduate student generate funds to pay for the expenses associated with attending a research conference? One suggestion for graduate students to generate funds it develop and host professional development workshops.

How it Works

At [University], graduate students conduct agricultural mechanics professional development activities for secondary agricultural education and industrial technology teachers because topics like welding might be taught in one or both programs. A needs assessment was conducted in [STATE] regarding agricultural mechanics competence. From this study, several areas were identified where agricultural education teachers needed professional development opportunities. Graduate students at State University organized and planned professional development activities with the guidance of the agricultural mechanics faculty member. During the first professional development activity, the graduate students assisted the faculty member in order to gain experience in running a professional development workshop. The subsequent professional development activities were conducted by the doctoral students under the guidance of the faculty member. The graduate students would typically host two or three day long Saturday workshops per semester with a maximum enrollment of 20 participants. Participants who attended all three workshops received a small discount. The faculty member would advertise the workshops by sending a workshop flier to all agricultural and industrial technology teachers via email.

In order to generate funds for the graduate students, a registration fee of $100 was charged to each participant for a day long workshop. The registration money was divided between the doctoral students that conducted the professional development activity. In order to organize the funds, the departmental financial officer handled registration, billing, and routing funds to the travel accounts for each of the graduate students involved. The funds could then be used to pay for the graduate student to cover any research conference expenses that were not covered by other funding sources. These funds were typically used to pay for airfare and registration costs upfront without the students having to be reimbursed. Although the workshop series has several

benefits, the student did encumber some financial hurdles. The students had to cover any additional travel, hotel, and food expenses and were then reimbursed after the conference causing some potential financial hardships for those students on a tight budget.

Results to Date

Three graduate students have conducted approximately eighteen agricultural mechanics professional development workshops and have collectively generated over $12,000. One doctoral student has individually generated over $5,000 from 15 workshops. The graduate students have been able to use the funds to pay for three regional and two national research conferences. They have also been able to pay for other items such as attendance to industry sponsored workshops, professional dues, and printing costs for research posters.

Implications

The utilization of graduate students to generate their own funds to attend research conferences and other professional development activities alleviates some pressure of the graduate faculty in being a sole provider of funds for graduate students. This also empowers the graduate students so that they feel they have some control over how much money they can generate and what conferences they can attend. By having graduate students conduct professional development activities, this also gets the students connected to the state stakeholders and provides additional outreach from the University. This connection is needed between the university and secondary agricultural educators in order to stay in touch with the needs of secondary schools.

Future Plans

Faculty at [University] plan to continue to use this model to increase the interaction between graduate students and state stakeholders while fulfilling the professional development needs of the graduate student and stakeholders.

Costs/Resources Needed

Prior to implementing workshops for graduate students to generate funds a needs assessment of secondary agricultural education teachers must be conducted. Graduate students and faculty must then plan and organize professional development activities based on the most critical needs of the stakeholders. Expenses for the workshops have initially been covered by the department and then deducted from the funds generated by the workshops.

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Localizing the Local Food Movement in School-Based Agricultural Education Curriculum

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Introduction

School-Based Agricultural Education has prepared students for careers in agriculture for over one hundred years. In that time, programs have evolved to meet the needs of students and industry, in order to equip students with the skills and knowledge to enter the workforce of American agriculture. Regardless of the structure of the program, agricultural education programs "should be designed to meet the needs of the local community" (Talbert, Vaughn, & Croom, 2005, p. 86). Over the past several years, "a substantial number of smaller-scale, locally oriented, flexibly organized farms and food producers are taking root throughout the United States" (Lyson, 2004, p. 61), attracting more consumers to learn about the source of their food, with national direct-to-consumer sales increasing to $1.2 billion in 2007, from $551 million in 1997 (Martinez et al., 2010) thus creating an opportunity for School-Based Agricultural Education to garner support and community involvement. Likewise, it also creates an opportunity for the local agricultural education program to provide educational outreach to their local community. Agricultural education programs incorporating and addressing aspects of the local food movement into their curriculum and programming have the potential to gain new support and interest in supporting School-Based Agricultural Education and FFA. Agricultural education instructor Sarah LaRose utilized the input of advisory committee members, Supervised Agricultural Experience (SAE) employers, and various agricultural organizations in the state to create and implement a Local Food Production curriculum within the agricultural program at Nonnewaug High School in Woodbury, Connecticut beginning in the fall of 2012. As a result, new community partners now support the programming offered by the agriscience program.

How it Works

Agriculture teacher Sarah LaRose noticed an increasing number of SAE students working in fruit and vegetable production, engaged in farmer's markets, and working for farms marketing produce through the Community Supported Agriculture (CSA) model. At the suggestion of members of the agriscience program's advisory committee, [agriculture teacher] began to build a Local Food Production curriculum based of the feedback from these stakeholders as well as previously existing syllabi from community colleges, junior colleges, and two-year associate's degree programs. LaRose applied for, and was awarded, a Food For All Grant from the National FFA Organization to develop a school garden which would produce food for the local food bank. FFA members created educational displays for area agricultural fairs which informed fairgoers of the project, as well as provided information on growing and cooking vegetables. During the first year of the project, two area businesses donated supplies and seedlings, and two local chapters of the State Grange donated seeds and seed potatoes. Additionally, the school constructed a greenhouse with three different hydroponic systems.

Members of the program's advisory committee were instrumental in helping to build new relationships with other area stakeholders in addition to LaRose making connections with area agricultural organizations. As a result, twelve new stakeholders joined as members of the advisory committee to help direct and shape the work of the curriculum. New members included area farmers, grocery store owner, produce manager, and chef/restaurant owner. These new supporters were eager to help out the agriculture program, leading to new fundraisers, guest speakers, field trip and SAE opportunities, and student-grown produce featured at two

restaurants, a grocery store, the local food bank, and the school cafeteria. Produce from the school's greenhouse and garden has brought new awareness to the program from new stakeholders who previously had not heard of the program

Implications

Agricultural education programs have the potential to harness new supporters by harnessing the energy and interest of those newly interested in food production. Though each program is situated in a unique community, "forming key partnerships with parents, knowledgeable individuals, businesses, groups, and other volunteers is a key to local program success. Partnerships allow the community the privilege of being a part of the agricultural education program and provide resources to make the program stronger" (Talbert, Vaughn, & Croom, 2005, p. 110). Rural sociologist Thomas Lyson describes the local food movement as being "civic agriculture" which he explains as "the embedding of local agricultural and food production in the community" and that "Civic agriculture is not only a source of family income for farmer and food processor; civic agricultural enterprises contribute to the health and vitality of communities in a variety of social, economic, political, and cultural ways" (Lyson, 2004, p.62). Capitalizing upon community building inherent in the local food movement can lead to increased community engagement and support for the agricultural education program, as well as new SAE opportunities for students and educational resources for the agriculture education instructor. In a 2007 study, researchers identified twenty-four categories of problems facing high school agriculture education instructors, including community support and fundraising (Boone & Boone, 2007, p. 39). Agriculture education instructors have the opportunity to capitalize on the community support developed by incorporating members of the local food movement into their program, and consequently possibly generate more funding for their programs.

Future Plans

The Local Food Production curriculum at Nonnewaug High School is currently in its fourth year of implementation and has produced over 5,000 pounds of produce donated to the local food bank, and continues to supply produce to the school cafeteria. New aquaponic grow systems have been incorporated into the curriculum. Agriculture education instructors, advisory committee members, and FFA Alumni members continue to develop the relationship with area stakeholders and have several fundraisers planned for this year. The program looks to continue to diversify their offerings and strengthen course enrollment. Other agriculture education programs around the state and country have solicited advice from the teacher who founded the program on how to incorporate aspects of the Local Food curriculum into their coursework.

Resources Needed

The Local Food Production curriculum discussed in this paper was developed by Sarah LaRose. Agricultural education teachers should utilize input from community stakeholders to develop curriculum specific to their community. Currently the United States Department of Agriculture has a useful tool on their website, the "Know Your Farmer Know Your Food Compass." It is available for free download at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=KYF_COMPASS .
Additionally, a variety of grants are available for construction of school gardens and greenhouses.

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Outback Wildcat: Teaching Agricultural Education in the Land Down Under

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Introduction/Need for Innovation or Idea

The Institute of International Education (2010) reported that the United States is behind several countries with similar economic stature in developing a sense of global competence in college students. Though the number of American students studying abroad is still limited, it has more than doubled from 1991/1992 to 2005//2006 (Institute of International Education, 2006). Reasons for the lack of interest or involvement in study abroad at the undergraduate level vary. Dolby (2005) found that US students' strong national identity prevents them from exploring the possibility of global experiences while Salisbury et al. (2009) believed it was the socio-economic status and the amount of capital resources retained prior to college admission. However, Bunch et al. (2013) believed the barriers and motivators were different at every university after comparing students between two land grant institutions.

Nonetheless, positive attributes are acknowledged when students expand their travels and scholastic studies internationally. Research in 2004 revealed study abroad as having a significant impact on students' continued language use, academic attainment measures, intercultural and personal development, and career choices (Dwyer, 2004). Agricultural education is no different. In a study conducted by Foster et al. (2014), positive results were found in students participating in an established study abroad course. Some of the results were: sustained change in the cultural knowledge, perceptions of knowledge, perceptions of skills, and perceptions of dispositions related to global competency.

How it Works/Methodology

A partnership was established with Charles Sturt University in the New South Wales state of Australia and The Scots School in Bathurst, Australia. In a program coined, "Outback Wildcat" agricultural education students are selected to student teach for half of their capstone semester in Australia under the supervision of trained teacher education faculty at Charles Sturt University. Participating student teachers from the University of Kentucky will pay their normal tuition cost. Furthermore, students at Charles Sturt University are allowed to attend the University of Kentucky (UK) at the cost of their own university's set tuition. The partnership is set up on a 1:1 attendance ratio.

Agricultural Education students interested in the student teaching experience will complete an application, participate in an interview, and be expected to meet a variety of expectations (3.2 cumulative grade point average, record of leadership success, maturity growth, etc.). Considering the academic calendar in Australia, UK student teachers are assigned a domestic cooperating teacher for their first two months (January & February) and complete their final two months (March & April) at the assigned agricultural education program in Australia. Cultural growth and competency evaluations are collected three times during the international experience and qualitative data is collected on a weekly basis.

Results to Date/Implications

Two students participated and completed the pilot program during the spring 2014 academic semester. In addition, a faculty member within the College of Education at Charles Sturt University received training necessary for the successful completion and teacher certification of all Kentucky post-secondary students.

Ninety secondary youth received Agricultural Science instruction from the two preservice teachers. During the international student teaching experience, the pre-service teachers participated in five Supervised Agricultural Experience home visits; three regional and national livestock shows; two regional equestrian competitions, and numerous extracurricular school activities. Student teachers maintained daily and weekly journals to highlight their experiences and document the multicultural growth and understanding of the cultural dynamic observed and taught. Finally, five students have completed applications and participated in interviews for the upcoming 2015 "Outback Wildcat" agricultural education student teaching experience.

Future Plans/Advice to Others

Future goals of the "Outback Wildcat" program as it relates to the student teachers includes: (a) expansion into the fall semester and (b) growth of agricultural education student teacher placements throughout the Bathurst region. Once the partnership is secure and quality relationships are established it is the intent of the UK agricultural education program to (c) establish a secondary agricultural education teacher exchange during each countries summer break and (d) create a two-week international course for undergraduate agricultural education students to participate in field experience observations. Finally, throughout the exchange the professors at each partnering university look to (e) evaluate cultural awareness gained and transition of cultural competence to secondary domestic classrooms.

Cost/Resources Needed

The "Outback Wildcat" program entailed a variety of expenses. Each participating student in the pilot project received a $1000 scholarship toward his or her tuition cost. Nonetheless, each student was responsible for their transportation to and from countries (~$1600); room and board provided by The Scots School ($3200); study abroad fees (~$200); and incidentals ($500). The Scots School provided the student teachers with transportation while living in Bathurst. Charles Sturt University provided housing during the Easter break and weekend activities when school were not in session. In the future, participating student teachers are eligible for scholarships from the University's study abroad office and College of Agriculture, Food and Environment. It is the intent of the program faculty to establish an endowment to assist students with travel expenses.

Costs and Funding Sources Associated with Participation

There are several noteworthy features of mechanism to fund students who participated in the pilot project. Each participating student received a $1000 scholarship toward tuition cost. Nonetheless, each student was responsible for her own transportation to and from Australia (~$1600); room and board provided by The Scots School ($3200); study abroad fees (~$200); and incidentals ($500). The Scots School provided the student teachers with transportation while living in Bathurst. Charles Sturt University provided housing during the Easter break and weekend activities when school were not in session. We anticipate that, in the future, participating student teachers will be eligible for scholarships from the University's Education Abroad office and College of Agriculture, Food and Environment. It is the intent of the program faculty to establish an endowment to assist students with travel expenses.

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Owl Pellets – Regurgitating Practical Tips for Agriculture Teachers

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Introduction/Need for Innovation or Idea

There exists a large divide between research and practice. Constas and Sternberg (2006) argued that "researchers write for other researchers rather than for practicioners; and when they do write with practice in mind, it is rare that what is written can support robust practical implementation" (p. 19). Agricultural education has faced this same challenge. Though a number of efforts have been made to extend research to the classroom, mediums like the *Agricultural Education Magazine* and regional research conference that include secondary educators have seen limited success. Very rarely are secondary educators seeking the *Journal of Agricultural Education* to find support and guidance in the daily grind of classroom instruction.

Denton, Foorman, and Mathes (2003) suggested a five-phase model to scale and sustain interventions resulting from research that included: (a) development of the intervention, (b) empirical evaluation of the intervention, (c) tests of robustness and generalizability, (d) Scaling up and sustaining, and (e) networking. Research and development is occurring within agricultural education departments nation wide. Empirical evidence is being collected and generalizations are being made. But what are the strategies to deliver this knowledge to secondary based agricultural educators currently exists? How are researchers purposefully building bridges between academic departments and secondary classrooms? Are networks created and sustained?

Constas and Sternberg (2006) attribute the scaling challenge in educational research to our research paradigm. We, as educators, view research as the development of insight rather than the development of robust practical applications for teachers. Owl Pellets is an attempt to do just that. Through a blogging and podcast platform, this innovation seeks to consume educational research in agricultural education, and "regurgitate" that information in a way that is palatable and accessible to secondary agricultural educators. Scalable applications of research are identified and networks are formed to create dialogue around teaching practices.

How it Works/Methodology/Program Phases/Steps

As a result of the scaling challenges described, three faculty members from different institutions met and created *Owl Pellets: Regurgitating Practical Tips for Agriculture Teachers.* The objective of the project was to identify key research practical to secondary agriculture educators and disseminate it in a concise and attractive platform conducive to those in the classroom. It was decided that these "pellets" would be in either a blogging format similar to that of the popular *eduTopia,* or in the form a short podcast including interviews with various researchers and practicioners.

Using the blogging website www.WordPress.com, research is converted to short "pellets", published, and then shared through the Owl Pellet Facebook page, Twitter feed, and WordPress blog. In addition, relevant seasonal topics are identified and experts in the respective topic are recruited for interviews and development of a podcast. The faculty members utilize online meeting software, as well as a free audio editing software Audacity, to record, edit, and comment on the discussion of interest. Once the podcast is edited and ready to publish, it is disseminated through the Twitter, Facebook, and Wordpress feeds. The goal is to provide weekly tips, suggestions, and scaled research suggestions through the blogs, and at least one podcast each week.

Results to Date/Implications

To date, there have been five WordPress posts that have received over 537 views from 355 visitors. The Facebook data reported a total reach of 526 viewers, with 342 included post reach. There have been 244 total page likes and over 40 post clicks. Twitter has also received over 300 views of the posts.

The first podcast, which focused on tips and thoughts for managing the National FFA Convention, included an agricultural educator from Florida discussing best practices. This podcast is the first completed and will be published during the month of October. Three other podcasts are in progress and will be released by the end of November.

Future Plans/Advice to Others

A schedule has been created to provide daily blog posts and weekly blogs. This schedule has been an important element of the process to ensure that there is an adequate supply of information to sustain the readership collected during the initial publishing of the resource. We hope to create a team of academics willing to contribute a short "pellet" following the publication of key articles into various publishing outlets.

Technology has been an important element of the innovation. The team has learned the importance of finding editing software, conferencing software, microphones, and recording devices to improve the processes. This continues to be a challenge as podcasts are developed and edited.

Costs/Resources Needed

At this point, the cost of the program has been minimal. The team has utilized current resources, free conferencing software, existing microphones and equipment, and social media sites that do not include a fee for usage. It is anticipated that additional costs will be incurred to improve the audio recording capabilities and the purchasing of an educational license for small audio clips will be purchased to include a modern intro and closure to each podcast.

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Pedagogical Content Knowledge Development in an Agriscience for Teachers Course

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Introduction

Effective teaching in the classroom requires teachers to develop a wide range of knowledge bases including pedagogical knowledge, content knowledge, and pedagogical content knowledge (National Research Council, 2010). Pedagogical content knowledge (PCK) is a special knowledge base for teachers that combines the two aforementioned knowledge bases (Shulman, 1986). PCK is one of the most important knowledge bases for all teachers to possess, including agriculture teachers (Roberts & Kitchel, 2010). Magnusson, Krajcik, and Borko (1999) assert that PCK development, while complex, can begin to be achieved in preservice teachers during their preparation programs. However, this important knowledge base must include purposeful instruction for development. One such course with potential to develop PCK in preservice teachers is the University of Georgia Agriscience for Teachers course. A version of this course has been offered since 2003, but the focus was on content knowledge development. Fall 2015, the course was revamped to more closely target the development of PCK. The particular course was chosen as the first platform to develop PCK, because a basic agriscience course is one of the most commonly taught courses in Georgia (Georgia Department of Education, 2013). Traditionally, University of Georgia offers a methods course prior to student teaching that encompasses all agricultural content through microteaching. However, the focus of the Agriscience for Teachers course was to specifically develop agriscience knowledge, and to provide students with the knowledge of how to best teach it.

How it Works

The purpose of the course was to combine content knowledge with pedagogical knowledge to develop students' PCK for teaching agriscience. The objectives of the course were for students to learn how to: manage an agriscience laboratory, build skills in safety and measurement, organize and present science and math concepts within an agriculture context, and connect pedagogical and agriscience content knowledge skills for teaching. The six units in the course were constructed based upon the 2013 Georgia Department of Education Basic Agriculture Science Standards. The units included: plant science, forestry, food science, environmental science, animal science, and agricultural mechanics. For each unit, two meeting times were used for the instructor, teaching assistant, and/or guest speaker to demonstrate ways of teaching that particular area of agriscience. Guest speakers included Georgia staff specialists and middle and high school agriculture teachers in Georgia. The Georgia state staff specialists are content and pedagogical experts who are hired to evaluate and aid teachers in their respective regions. Additional meeting days were utilized for student teaching demonstrations.

Course assignments included team lab demonstrations, individual lab demonstrations, completion of an agriscience fair project, and peer critiques throughout the semester. For the team and individual demonstrations, students were required to submit content representations (CoRe) reflections developed through previous science PCK research (Loughran, Berry, & Mulhall, 2012). In a study utilizing the CoRe reflection in a science classroom, Hume and Berry (2011) determined the tool was useful in assisting students in developing their PCK at the preservice level. Questions from the CoRe rubric included: what difficulties or limitations were connected with teaching this idea, what misconceptions or preconceptions will students have with this idea, what knowledge about students' thinking will influence your teaching of this idea, and what teaching procedures will be used to engage with this idea, among others. For each individual demonstration, the observing students completed a peer reflection sheet. These

reflection questions were also utilized as discussion points throughout the semester to help students develop their PCK for the major topics covered in the course.

Results

A questionnaire was distributed to the course participants anonymously halfway through the semester to provide feedback on the effectiveness of the course. Overall, students enjoyed the content of the course, but still felt rushed with the 75 minute twice a week time frame. In order to more fully explore the why behind the content, more time for the course or restructuring of the course would be ideal. The students particularly enjoyed the guest speakers because they taught them the content while teaching them how to teach the content, an important component of PCK. One student commented, "Not only do we have the opportunity to learn the content, but we will also leave the class with a set of lessons for each content area." However, some students did not fully connect the importance of completing the CoRe rubric to their PCK development and their future teaching. One student commented, "I often found the CoRe sheet to be more of a hindrance than a benefit to my planning strategies." This is similar to research from Hume and Berry (2011) who experienced some pushback with their initial implementation of the CoRe rubric. It is recommended if the CoRe rubric is utilized in the future that more explicit instruction be provided as to its importance and purpose in developing PCK.

Future Plans

The Agriscience for Teachers course template should be utilized to form other courses to educate preservice teachers on how to teach particular content areas. Additionally, beginning the course with an explicit explanation of PCK to increase students' understanding could also be beneficial. Open ended responses from the questionnaire suggested that students are still segmenting content knowledge and knowledge of teaching strategies. Finally, utilizing the CoRe rubric in another existing course like Greenhouse for Teachers in spring 2016 may shed light on if the struggle with the CoRe reflection was subject specific in nature, related to the amount of critical thinking required, and/or if more explanation on its purpose can be given to change the perception on its effectiveness as a teaching tool.

Costs

The University of Georgia charged each student a $60 fee for enrolling in the course to purchase and provide resources and materials for labs. Instructors utilized money to provide each student with a Project Learning Tree: Environmental Education Activity Guide, Project Wild K-12 Curriculum and Activity Guide, and various laboratory demonstration kits.

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Promoting College and Career Opportunities in Agriscience: The Tennessee State University College and Research Showcase

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Introduction/need for innovation or idea

How can agricultural educators recruit, retain, and graduate students that will pursue college and career opportunities in agriculture? There continues to be a shortage of qualified graduates for agriculture and natural resources job openings in the United States (Goecker, Smith, P. G., Smith, & Goetz, 2010). Furthermore, agricultural careers are often viewed as only being related to production agriculture with difficult work for low pay; students are generally unaware of how agriculture affects their lives and the wide range of careers available in agriculture (Dobbins, King, Fravel, Keels, & Covington, 2002; Luckey, Murphrey, Cummins, & Edwards, 2013; Smith & Parks, 2009; Sutphin & Newsom-Stewart, 1995). The future of the agriculture industry depends on how the profession answers the aforementioned question.

In Priority 3 of the National Research Agenda, Doerfert, D. L. (Ed.) (2011) states:

> In order to further improve agricultural productivity efficiency and effectiveness in meeting our global food, fiber, and energy needs, a sufficient supply of well-prepared agricultural scientists and professionals is needed to drive sustainable growth, scientific discovery, and innovation in public, private, and academic settings. (p. 9)

Providing experiences for high school students to learn more about the vast college and career opportunities in agriculture could be a practical and effective way to eliminate the shortage of qualified workers. Hosting high school students on a college campus will expose them to various scientific and innovative activities that are important in agriculture. In addition, having faculty visit the high schools promotes an ongoing dialogue focused on agriculture and helps to foster strong relationships that can influence students to pursue a degree in agriculture.

How it works/methodology/program phases/steps

Pre-event: In the Fall, seven high schools with agriscience programs within 45 minutes of Tennessee State University (TSU) were invited to bring up to 25 students to campus to participate in our "College and Research Showcase". Teachers selected students that were interested in agriscience careers and research. The teachers had students identify a category of agriscience research that they were most interested in learning more about.

Event Day: College of Agriculture, Human and Natural Sciences (CAHNS) Ambassadors and faculty greeted students and teachers upon arrival at 9:30 am; each student completed a contact card to help the CAHNS with their efforts to communicate with potential students. Prior to lunch students participated in presentations that highlighted opportunities at TSU and in the CAHNS. College students and faculty gave tours of the agriculture facilities with demonstrations of various agriscience research. During lunch CAHNS Ambassadors visited with the high school students to share stories of college life and tips for preparing for college. After lunch high school students participated in break out sessions designed to promote FFA Agriscience Fair projects. The National FFA Agriscience Fair Handbook outlines six category areas for students to conduct research. High school students attended one of the six category area sessions, which were led by faculty with expertise in that area of agriscience. The event concluded at 1:15 pm.

Post Event: CAHNS Ambassadors and faculty followed up via email with students and teachers to provide additional information and resources for college and agriscience research. Faculty

visited high school campuses to further discuss college opportunities and agriscience fair projects. Faculty and college students have also served as judges for the FFA Agriscience fair contests held at schools.

Results to date/implications

About 175 agriscience students and teachers attended the College and Research Showcase. Numerous students and teachers provided unsolicited comments in person and/or through email sharing positive comments about what they learned in the various sessions. In addition, over 100 students from the seven schools are currently conducting research for the FFA Agriscience Fairs at their respective schools. Teachers reported that over 75% of these students are participating in the Agriscience Fair for the first time.

Future plans/advice to others

Hosting high school students for the College and Research Showcase seemed to be a worthwhile event; based on the feedback of teachers and students it appears that participants are more likely to pursue a degree/career in agriculture. In order to quantify the impact of the event, future plans include conducting a study to examine the perceptions of students towards agriculture degrees/careers and their intent to pursue agriculture degrees/careers both before and after the event.

In addition, the event could be improved by having agriculture industry professionals at the event to speak with students and set up booths/displays that promote agriculture careers. Having industry representatives at the event would allow the participants to see how an agriculture degree could be used. Students could ask questions that may influence their decision to pursue a career, such as: “What does a typical day/week look like for this position?”, “What specific skills are you looking for in an employee?”, or “What pay range and benefits are associated with this position?”.

Costs/resources needed

The costs and resources needed to host the event are minimal. The only cost incurred by the college that is not normally incurred with regular activities was the cost for lunch. Our college bought 200 boxed lunches for the high school students, their teachers, and for the college students and faculty that led sessions. Each lunch cost $6.00 so the total cost for the event was $1,200.00. In-house printing was utilized for the agenda and additional handouts for the break out sessions. A variety of University and College brochures were given out to highlight opportunities for prospective college students. Six faculty members took the lead to develop and facilitate break out sessions aligned with the National FFA Agriscience Fair categories. Nine CAHNS Ambassadors volunteered their time to guide tours and to share their college stories and experiences during lunch.

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Using the Bennett Mechanical Comprehension Test in the Agricultural Mechanic's Lab

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Introduction

Educational laboratories are an integral part of many agricultural education programs, providing students an opportunity to learn by doing (Sutphin, 1984). Previous research has indicated that considerable instructional time is spent teaching agricultural mechanics (McKim & Saucier, 2011) and that this type of instruction is important in the areas of teacher education. As such, it is critical that agriculture educators receive adequate agricultural mechanics laboratory management education (Andreasen, Seevers, Dormody, & VanLeeuwen, 2007; Saucier & McKim, 2012).

Knowledge of cognitive strategies is usually not enough to promote student achievement and learning; students also must be motivated to use the strategies and regulate their effort (Pintrich, 1988; Pintrich,1989). Students' perceptions of the classroom as well as their individual motivational orientations and beliefs about learning are relevant to cognitive engagement and classroom performance (Nolen, 1988).

How It Works

We used the Bennet Mechanical Comprehension Test (BMCT) with our undergraduate agricultural education majors taking an introductory level agricultural mechanics course. The BMCT is an assessment tool for measuring a candidate's ability to perceive and understand the relationship of physical forces and mechanical elements in practical situations (Bennet, 1994). This aptitude is important in jobs and training programs that require the understanding and application of mechanical principles. The current BMCT Forms, S and T, have been used to predict performance in a variety of vocational and technical training settings and have been popular selection tools for mechanical, technical, engineering, and similar occupations for many years.

Students completed the exam the second week of the course during the course lecture. After the exams were analyzed, students were shown a representation of their scores compared to norm-referenced scores of various professions (welder, heavy equipment operator, engineer, etc.). A comparison of scores to norm referenced data occurred, and used to motivate students when learning agricultural mechanics based skills, then their mechanical aptitude and ability was discussed to allow them to become better agricultural educators.

Each form of the BMCT is composed of 68 illustrations of simple and traditionally encountered mechanisms. For each item, the examinee reads a question about an illustration, examines the illustration, and chooses the best answer to the question from among three options. Though a 30-minute time limit exists for completing the test, the BMCT is not truly a speeded test. Speeded tests are composed of relatively easy items and rely on the number of correct responses within restrictive time limits to differentiate performance among examinees. Because BMCT items represent a wide range of item-level difficulty, it is considered a timed power test (Bennett & Cruikshank, 1942).

The relationship between BMCT scores and on-the-job performance of incumbents in various occupations, organizations, and industries has previously been established (Leuty & Hansen, 2006). Job performance was defined as supervisory ratings on behaviors determined through research to be important to jobs requiring mechanical reasoning ability (e.g., "demonstrates

mechanical knowledge and expertise"). Supervisory ratings on a single-item measure of job potential were also obtained. The study found that BMCT scores correlated with job performance for all groups. Specifically, uncorrected correlations with supervisory ratings of mechanical understanding/problem solving ranged from .32 (manufacturing employees) to .50 (transportation trades/equipment operators). Reliability estimates for the BMCT in previous studies ranged from .84 to .92. The BMCT was found to have a Cronbach's alpha score of 0.75 during this study. Previous studies have shown strong support for the validity of the BMCT (Muchinksy, 1993).

BMCT Forms S and T were developed for adult assessment applications. In employee selection, the BMCT may be used to predict success in certain industrial, mechanical, and engineering jobs. It is also useful in monitoring the effectiveness of mechanical comprehension instruction and training programs, and in researching the relationship between mechanical comprehension and other abilities or traits.

Results to Date

Using the BMCT has shown to motivate students of various levels. Students whom have an extended background in agricultural mechanics usually score in the mid to high range of the tests, but a little lower in their overall mean than professional welders and other industry occupations. This has resulted in some students understanding the limitations of their knowledge and having an appreciation for learning other concepts within the course. Plainly stated, some students realize they didn't know as much as they thought they did before.

Using the BMCT has also shown to positively motivate students who have little agricultural mechanics background. While receiving mid-range scores, they are motivated by the fact that they indeed have some level of mechanical aptitude. This is reinforced during the discussion on scores and mechanical aptitude in the agricultural mechanics lab.

Future Plans

Researchers plan on observing how using this and other aptitude instruments to motivate students impact their overall change in behavior and learning. The goal of this research is to add to the pool of knowledge and toolbox of educators for motivating students to learn new skills. The researchers plan on looking at correlations between BMCT scores and agricultural education students' demographic characteristics.

Costs/Resources

The resources required are students taking an undergraduate agricultural mechanics course. The BMCT instrument itself costs approximately $20 per test booklet and $8 per examination. This research was made possible by a United State Department of Agriculture Higher Education Challenge Grant.

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Using Weeklong Educational Excursions to Promote International Experiences

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Introduction

Throughout the literature, researchers have agreed that internationalization is a priority among universities (Briers, Shinn, & Nguyen, 2010; Childress, 2009; Norris & Gillespie, 2010; Wingenbach, Boyd, & Linder, 2003). To reach the goal of doubling the amount of U.S students participating in an international experience (IE) by the end of the decade, a 14.5% increase is needed each year (IIE, 2014). International experiences (IEs) among students in agriculturally related majors increased 12.7% from the prior year, just short of the yearly goal (IIE, 2014). While students have reported personal interest in participating in IE (Danjean, Bunch, & Blackburn, 2015; Briers et al., 2010; Bunch, Lamm, Israel, & Edwards, 2014), a variety of factors can influence whether or not students actually participate.

Spiering and Erikson (2006) found that students who chose not to take advantage of IE opportunities were deterred by the complexity of the IE process and presence of too many barriers, as well as by the inability to try out the experience during a shorter period of time. Of the barriers reported in the literature, time and financial cost have been reported most frequently (Briers et al., 2010; Danjean et al., 2015; Ludwig, 2007). As per Ajzen's (1991) Theory of Planned Behavior, students' perceptions of barriers can negatively affect the likelihood they will participate in an IE. However, students may still choose to participate if they perceive motivating factors to outweigh potential barriers (Ajzen, 1991). In prior studies, students were motivated to participate if they perceived the IE as important and worth pursuing (Briers et al., 2010; Bunch et al., 2014; Danjean et al., 2015). Other motivating factors reported in the literature include career relevance of IE subjects and activities, gaining life experience, opportunities to experience another culture, peer influence, and strengthening a resume (Briers et al., 2010; Danjean et al., 2015; Zhai & Scheer, 2002).

How it works

Undergraduate and graduate students at Louisiana State University were given the opportunity to participate in a weeklong, international education excursion to Nicaragua during the spring break holiday. As part of the program, students participated in all day excursions to a coffee plantation, tobacco plantation, and rice farm. During these excursions the students met and spoke with business owners and managers to learn about the agricultural production process and practices at each site. Intermixed with the agricultural excursions were cultural experience activities, which included a lunch hosted by a Nicaraguan family, a zip-lining excursion through the rainforest canopy, a tour of Granada's historical structures, a boat tour of lake Nicaragua, and a trip to the Messiah Volcano. The third component of the trip was centered on service learning.
The students participated in a scavenger hunt at the local market, during which they had to communicate and bargain with local vendors to purchase the food items on their list. The students then packaged and distributed food bags to families in a low-income neighborhood. The second half of the service learning day included a visit to a local elementary school. The students aided the elementary students with their homework and played games with them at recess. Students' perceptions of the international agricultural education experience in Nicaragua were examined using pre and post trip meetings, field notes taken by the researcher, and journal entries and photographs submitted by the students.

Results to Date

To date, four undergraduate students and three graduate students participated in the one-week international agricultural education experience in Nicaragua. The students' reactions regarding their experience in Nicaragua were positive, and all students identified several benefits gained from their experience. In addition to "having a good time," one student stated, "you can also develop your future by meeting all these different farmers…we have lifelong relationships with them now, so when we become teachers we will be able to connect back with those people." Another student noted their change of perspective during their experience in Nicaragua and stated, "I feel like you come back with your eyes a little bit more open…I had the feeling a couple of times [there are] little things that we take for granted every day." Regarding the barriers they had to overcome, one student acknowledged that financial cost was initially perceived as the major barrier, but stated "the money we paid was chump change for the experience that we got." Another student added "the value of the experience is truly priceless when you think about it…as far as time goes, it's worth every bit of the time we spent there." The students also reported that efforts made by faculty to make them feel more comfortable going abroad helped them overcome fears that may have otherwise prevented them from participating in this experience and potential future international experiences. Of the students who participated in the international agricultural education excursion in Nicaragua, two later participated in a longer international experience in Slovakia.

Cost

The cost associated with the one-week Nicaragua educational excursion is the current cost of the program fee, tuition/fees, and airfare. At this time, the program fee is $2,200, which includes all excursions, hotel rooms, meals, and all ground transportation. The current cost of tuition at Louisiana State University is $252.20 per credit hour for undergraduate students and $305.60 per credit hour for graduate students. Each student earns one credit hour for completing the program successfully. It should be noted that undergraduate students who meet the requirements for the state funded tuition program will have their tuition waived. The airfare cost ranges between $400.00 and $600.00 per each ticket. As a result, the total cost of this one-week Nicaragua educational excursion ranges between $2,600.00 - $3,052.20 for undergraduate students, and $2,905.60 - $3,105.60 for graduate students, respectively.

Future Plans

AGED faculty at Louisiana State University plan to continue offering the Nicaragua educational excursion. Each year, the itinerary will alternate site visits to include all types of Nicaraguan agriculture to represent all students' majors. As such, future in-country excursions will include visiting a Spanish horse breeding ranch, cattle ranch, livestock harvest facilities, and a banana plantation. The faculty plan to continue to include cultural activities and a community service component in the program. At the conclusion of each excursion, the AGED faculty plan to analyze the student pre and post trip focus group interviews, student journals, and student photographs to assist in determining how the students' perceptions of participation in study abroad programs has changed as a result of this one-week educational excursion to Nicaragua. Finally, it is anticipated that AGED faculty will examine other variables included in students' decisions to study abroad to better understand this phenomenon.

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Research Posters

A Qualitative Study Investigating Students' Perceptions of Experiential Learning within an Agriculture Curriculum

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Introduction

Priority Area 1 of the *National Research Agenda: American Association for Agricultural Education's Research Priority Areas for 2011-2015* recognizes the need for agricultural literacy (Doerfert, 2011). Also in Priority Area 1, it encourages the study of "delivery method preferences and effectiveness" (Doefert, 2011; p. 8) in agriculture and natural resources. It has been long stated that agriculture "is too important a topic to be taught only to the relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies" (National Research Council, 1988; p. 1). One of the key methods of teaching agriculture is through hands-on application. Experiential learning is championed because it allows the learner to make lasting connections with the subject matter through engagement and reflection (Northern Illinois University, 2011). By introducing agriculturally centered lessons and utilizing experiential learning theories, researchers can have a positive impact on increasing agricultural literacy (Blair, 2009).

Theoretical Framework

Kolb's (1984) model of experiential learning was used as the theoretical framework for this study. Experiential learning builds on the foundation that learning is a process which focuses on experimentation, active engagement, and reflection (Baker, Robinson, & Kolb, 2012). Experiential learning is a valuable tool in education because through engagement, it promotes an atmosphere for critical thinking and problem solving (Wozencroft, Pate, & Griffiths, 2014).

The model for experiential learning conceptualizes learning based on experiences in four components: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). Concrete experience begins with the learner experiencing a situation. Reflective observation requires the learner to examine the concrete experience in order to conceptualize a variety of perspectives to place meaning with the experience. In abstract conceptualization, the learner builds on their reflective experiences to examine and infer logical conclusions from the experience. Finally, active experimentation propels the learner to make decisions and apply concepts to new and future experiences (Dunlap, Dobrovolny, & Young, 2008).

Methodology

The purpose of this study was to examine student perceptions of using experiential learning while being taught agricultural lessons. This study implemented qualitative methods to gain an in-depth understanding of student experiences related to agricultural lessons and experiences. The researchers developed questions related to the lessons and student experiences in an attempt to ensure responses adequately represented students' true thoughts and feelings. The following research objectives guided this study:

1. Explore students' prior and current perceptions of agriculture.
2. Explore students' views toward the agriculturally contextualized lessons.
3. Describe the students' views of experiential learning as it relates to the agricultural lessons.

The focus group was used to investigate research objectives and consisted of 10th grade Biology students (N = 21). Masadeh (2012) reported focus groups allow for participants to engage in deep discussions concerning related topics. The author further contended because of the intentional design of focus groups, they are beneficial in producing precise responses rather than generalizations (Masadeh, 2012). The focus group was conducted and facilitated by an additional researcher who had knowledge of the ongoing project.

After the focus group was conducted, responses were digitally recorded and later transcribed verbatim into Microsoft Word ©. Additionally, focus group responses were compared with detailed notes and observations from the interviewer for coding and theme analysis.

Results/Conclusions

This study took place during the spring of 2015 at a private school in northeast Mississippi. Private schools were identified as schools that received no state funding and/or that are members of the Mississippi Association of Independent Schools. Students were taught six (6), 45-minute lessons that were contextualized in agriculture focusing on a variety of agricultural topics. Students received modified instruction through the incorporation of hands-on activities. Examples of the activities included fertilizer spreading, experience with soil textures and profiling, and a fully functional high-tunnel for plant growth and fertilizer responses.

Based on the objectives of this study, three overall themes emerged from student responses via the focus group:

1. A low and negative perception of and awareness of agriculture.
2. Enjoyment and satisfaction of experiential learning and agricultural activities,
3. Increased appreciation for agricultural production practices, and the importance of the role agriculture plays in food production and society.

The focus group revealed students had a relatively negative and narrow perception of agriculture (Frick, Birkenholz, Gardner, & Machtmes, 1995) before they experienced any lessons or handson activities. After their experiences, students revealed they began to view agriculture in a positive light and more in-depth. Students indicated they were now aware of the history of agriculture and processes related to food production. The focus group also revealed their level of satisfaction and enjoyment of being taught agricultural lessons; furthermore, student responses indicated how basic science concepts they had already been taught are related to agriculture (Blair, 2009). By using hands-on experiences, the students expressed this approach led to increased retention of content and how their experiences helped them appreciate everything that agriculture encompassed (Northern Illinois University, 2011).

Recommendations

The findings from this study can be used to encourage future research to target populations that traditionally do not receive any type of formal agricultural education as well as assessing agricultural literacy. This study targeted a private school because in Mississippi, private schools are open to modifications in the curriculum to allow agriculturally centered teachings/lessons.

When possible, appropriate hands-on activities should accompany these lessons to foster a more intimate connection with the material.

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An Evaluation of a Youth Camp Program's Impact on Parents' Perceptions of Sustainability and Family Engagement

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Need for Research

Education concerning agriculture and the environment is an important component in building and sustaining healthy communities and is critical in addressing increasing food security and natural resources issues (Stern, 2000). Research has shown there are many positive outcomes from building youth and adult partnerships, and collaboration among these groups should be a primary focus for camps and organizations who wish to have an impact on agriculture and the environment now and for future generations (Camino, 2000). In consideration of the impact parental involvement has on positive youth development (Cheung & Pomerantz, 2011; SimonsMorton & Crump, 2003; Wang & Sheikh-Khalil, 2014), educational programs should encourage the active support and engagement of parental involvement with youth (Simons-Morton & Crump, 2003) and invest time and resources in activities and strategies which will foster stronger connections to environment-based participatory programs (Monroe, 2003). According to priority four of the American Association for Agricultural Education's National Research Agenda, "learners in all agricultural education learning environments will be actively and emotionally engaged in learning, leading to high levels of achievement, life and career readiness, and professional success" (Doerfert, 2011, p.9).

Theoretical Framework

The theoretical framework used to guide this study was Social Cognitive Theory (SCT), which posits that learning is best accomplished through developing social interactions within a conducive learning environment related to the content learned (Bandura, 1986). This theory emphasizes the learning process as being a result of the constant reciprocal interactions of cognitive, environmental, and behavioral variables which include personal factors of the individual, the environment in which the individual is situated, and the behaviors of others within the environment (Schunk, 2012). The environment for which the study took place was influential in providing opportunities that supported the experiential learning process (Kolb, 1984).

Methodology

This qualitative research was conducted as a single case study. Direct observations were made in the field during the implementation of the sustainable-living curriculum at a summer youth camp. The curriculum was delivered to campers in the form of a scrapbook that contained information and suggested activities related to sustainable agricultural practices and the environment. A focused group interview was conducted with two camp counselors concerning the delivery of the curriculum and counselors' perceptions of the experiential learning process. A pilot focus group with parents of campers served as a guide for designing the interview protocol for the parent interviews. Focused interviews were conducted with four parents of campers who received the scrapbooks, and three focused interviews with parents of campers who did not receive the scrapbooks. The interviews were transcribed and returned to participants for member checking. The transcriptions were then coded based on emergent themes. Measures of trustworthiness and rigor were taken through persistent observation, triangulation, peer debriefing, and member-checking (Lincoln & Guba, 1985).

Findings

Four themes arose from the counselor interviews. The first theme, benefits of Experiential Learning, was exemplified in the following statement, “cooking with the herbs, they loved just eating and having those things so I think having those good hands on activities really made it, even if that was something that they hadn't experienced before, it made it more relatable to them.” The second theme, depth of conversations/interactions were improved with use of scrapbooks, emerged through comments like “with this group of kids, I became so much more involved than any other group and I do believe it has to do with the garden and the scrapbook building.” The third theme, kids like taking ownership of learning, was evident in comments like, “they had created their own challenge items and I think having that space where they could create their own and it was in there was helpful.” The last theme, counselor’s learning and selfefficacy improved and increased engagement with campers, was supported by the comment, “this has been really helpful and really empowering for me and I've noticed that this two-week session, I feel like I've really hit my stride with interacting and teaching the kids and I really think it has to do with having this as a tool.”

Three themes emerged from the parent interviews. The first theme, benefits of learning with children, emerged as several parents made comments like “if she came home saying that you shouldn't be using these chemicals in the garden because it's harmful we would listen to that. I mean, we already try not to, but, it would still make an impact and kind of remind you that your kids are going to be on the Earth longer than you are and you need to take care of it.” The second theme, methods of engaging families, was observed from comments like “I think the best transfer for that, because the children would be the most excited about it, would be hands-on activities during camp. Then that’s created into some kind of hands-on activity that they make. They can then transfer that information over to the parents.” The last theme, values and knowledge parents want children to have, emerged from comments like “I think it's important they really understand where their food comes from and I love my kids to understand, to visit a farm where we get the grapes, to go see where our water comes from because we have well water.”

Conclusions

Monroe (2003) suggested that the very act of seeking out information is itself a behavior; therefore, when evaluating behavior changes it is also important to include the desire of individuals to gain information. Parents reported interest for enrolling their children in the camp program in order to receive specific information on sustainable agricultural practices. They also reported an assumption that the camp experience would inspire motivation for the child to share what they learned and provide opportunities at home in which the family could be involved. The camp counselors reported the benefits of having the curriculum to provide the necessary information and activity suggestions for which they felt confident to provide more experiential learning opportunities in the garden and develop deeper, more meaningful educational experiences with the campers.

Recommendations

The values and beliefs of parents are important in designing programs for children because they will help inspire prolonged behavior and literacy changes at home and in the future. The triadic reciprocality of SCT helps to illustrate the benefit and importance of understanding parent's desires and needs when designing future educational programs for youth.

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An Examination of a Graduate Learning Community in a College of Agriculture

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Introduction and Theoretical Framework

Less than 60% of students who start a PhD complete their program (Sowell, 2008; Sowell, Allum, & Okahana, 2015). Some challenges include difficulty forming connections to their program and socializing into their profession (Schlossberg, 1989; Tinto, 1993; Austin, 2002; Golde, 2001). Learning communities have been used with undergraduate and graduate students and have been defined as having a purpose "to provide a safe environment for trust building so that students and faculty serve as instructors of one another. Additionally, the community provides opportunities for peer coaching and a resource network" (Thompson, 1998, p. 3). This study addresses priority three in the AAAE National Research Agenda (Doerfert, 2011) to create a "sufficient scientific and professional workforce that addresses the challenges of the 21st century" (p. 18) as this learning community sought to "…prepare, promote, and retain new professionals who demonstrate the requisite content knowledge, technical competence, and cultural awareness, coupled with communication and interpersonal skills" (Doerfert, 2011, p. 20).

Tinto's persistence model (Tinto, 1993) posits a graduate student's commitment to their goals and institutional commitment is determined primarily from their ability to integrate academically and socially into their academic contexts. Graduate learning communities have the potential to support the academic and social integration of graduate students.

Purpose and Methodology

At Texas A&M University, a graduate learning community was developed to support the transition of graduate students entering the College of Agriculture and Life Sciences. The purpose of this study was to describe the experiences of a first-year graduate learning community focused on retention of graduate students, successful integration into graduate school, and leadership and research skills. The specific questions which guided this study included: (a) How do members of the graduate learning community describe their experiences in the learning community? And (b) How can the graduate learning community experience be enhanced in future years? A basic qualitative method was used (Merriam, 2009) including a purposive sample of graduate students who were members of the graduate learning community at [university] in the [college] during the [years] academic year. Data were collected through semi-structured interviews with eight graduate students. Follow-up interviews were also conducted to obtain further perspectives from some individuals. The constant comparative method was used for data analysis (Glaser & Strauss, 1967).

Trustworthiness of the data was established through transferability, credibility, dependability, and confirmability. Purposive sampling and thick description were used to provide transferability; dependability and confirmability were established through an audit trail and details of the data collection recorded in a reflexive journal; peer debriefing and member checking was conducted to ensure credibility of the study.

Results and Conclusions

Participants in this study described their experience in the learning community primarily through two themes: most meaningful experiences and least meaningful experiences. According to one student, "Having the learning community is helpful because it gives you people that are going through the same fears/worries as me…" (LC2). Another student said that the learning community helped her survive her first year of graduate school. Part of that was knowing that other students

were going through the same thing she was (LC6). At the formal meeting which occurred monthly, students appreciated learning about themselves: their strengths and personality types. They also appreciated the life planning sessions. LC7 stated, “For me, the most meaningful part of the learning community was the life-planning session. I constantly struggle with making decisions and that gave me a good lens to begin making big life choices.”

Students also discussed things that were “least meaningful” to their experience as part of the learning community. LC1 said, “I guess if I had to pick something it would be the personality tests. Though meaningful it just reaffirmed things I knew about myself…” Others noted another component that was least meaningful, which was when faculty members discussed their expectations of a mentoring relationship: “…whenever we had the faculty members come in to discuss expectations of a mentoring relationship with us I was a bit left out. This is mostly due to the fact that I am not a 'science-based' major and therefore have no labs” (LC7).

Participants shared their perspectives on changes they would recommend for the learning community, which resulted in two themes: structure and social interaction. In regards to structure, one student suggested [faculty] in the program should discuss more opportunities for LC members to professionally develop as grad students. Yet another recommendation was to have a meeting dedicated to professional development items like writing grants, designing posters, presentations, etc. (LC4). One suggestion to promote social interaction and provide more structure was to incorporate conversation starters within a meeting to help members of the learning community bond and to get around the idea of a “best-face-forward” mentality that existed in the learning community (LC6).

Based on the findings, it was concluded that graduate students found meaningful experiences from the learning community, which helped them to integrate academically and socially into their academic contexts (Tinto, 1993). Students also suggested changes which would make the experience more impactful in the future.

Implications and Recommendations

Given the priority of creating a professional and scientific workforce (Doerfert, 2011) and the challenges faced by graduate students in completing their graduate programs (Sowell, 2008; Sowell, Allum, & Okahana, 2015), the graduate learning community should continue in the [college] to support graduate students’ integration into their programs both academically and socially. The learning community should address the recommendations from this study to make the learning community more effective for helping students transition to their graduate programs.

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Analyzing the Needs of High School Agricultural Education Teachers towards Classroom Diversity & Inclusion

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Introduction/conceptual framework

Agricultural education has always been a practical option for high school students regardless of their race, ethnicity, mental, or physical ability. From non-traditional students to students with disabilities, agricultural education teachers have always been charged with ensuring academic success to a diverse group of students. Although many have had success in these endeavors, research findings indicates that agricultural education teachers still desire adequate assistance in working with diverse populations (Johnson, Wilson, Flowers, & Croom, 2012; LaVergne, Jones, Larke, & Elbert, 2012; Talbert & Edwin, 2008). Because of their roles in the success of these individuals, ensuing that agricultural education teachers are prepared to function effectively in 21st century classrooms continues to remain important. As LaVergne, Jones, Larke, & Elbert (2012) state: "teachers of agricultural education must be prepared in terms of philosophy, pedagogy, and curriculum to embrace the complexities of an increasingly diverse student population, and actively work on preparing this population for a positive matriculation in agricultural education programs" (p.47).

The conceptual framework that guided this research was based upon LaVergne's (2008) Diversity Inclusive program model. LaVergne proposes that a diversity inclusive program is where multicultural education, inclusion, and culturally responsive teaching take place. Teachers and programs that are diversity inclusive have positive perceptions about (a) the benefits of diversity inclusion; (b) understanding that, because of past perceptions, pre-existing barriers may be reasons why students of color and students with disabilities are underrepresented, and (c) having an awareness of possible solutions to increase underrepresented group participation. The researcher also calls for individuals to constantly seek strategies and solutions to increase underrepresented-group participation while becoming supporters of those who understand that, successful agricultural education programs will be determined by how prepared individuals are in teaching diverse populations (LaVergne, 2008).

Purpose and Objective

The purpose of this study was to describe the perceived needs of Kentucky, Maryland, Ohio, Pennsylvania, Virginia, and West Virginia agricultural education teachers regarding classroom diversity and inclusion. Specifically, the objective was to describe the extent to which these agricultural education teachers desired information regarding the inclusion of students of color and students with disabilities within their programs.

Methodology

This study utilized descriptive explanatory research. Survey research methods were implemented to gather information to describe high school agricultural education teachers' perceptions regarding classroom diversity and inclusion. The population examined in this study was high school agricultural education teachers in Kentucky, Maryland, Ohio, Pennsylvania, Virginia, and West Virginia during the 2011-2012 school year (N = 1441). The sampling frames used were the 2011-2012 agricultural teacher directories as provided by each state's agricultural education supervisor. This list is updated annually and serves as the most exhaustive list of agricultural educators for each state.

The questionnaire was developed by the researchers with some questions being modeled after the LaVergne (2008) study on Texas agricultural education teachers regarding diversity inclusion in

high school agricultural education programs. Survey implementation and data collection methods followed Dillman's (2009) *Tailored Designed Method*. A panel of experts with expertise in diversity and inclusion established content and face validity. Non-response error was addresses by comparing early respondents to late respondents on key demographic variables. No statistically significant differences were found between the two groups. Four hundred and thirty three agricultural teachers responded for a 30% response rate.

Findings

Nine statements were presented to respondents concerning their perceived diversity and inclusion needs as it relates to students of color and students with disabilities in agricultural education programs. A majority (79.6%) of the respondents strongly agreed or agreed to the statement: "I need more teaching strategies to use with English as a Second Language (ESL) students". Similarly, a majority (76.3%) of respondents strongly agreed or agreed to the statement: "I would like more information about customs and tradition of students from different cultural backgrounds", while 73% of respondents strongly agreed or agreed to the statement: "I need more information on customs and traditions of students from different racial/ethnic backgrounds". Concerning students with disabilities, 72.5% of respondents strongly agreed or agreed that more information is needed of the different types of students with disabilities. In addition, 72% of respondents strongly agreed or agreed to the statement: "I need more information on teaching techniques to use with students with disabilities within my classroom". Contrariwise, a majority (58.5%) of the respondents strongly disagreed or disagreed to the statement: "I need more information understanding student Individualized Educational Plans".

Conclusions/Implications

Based on the results, the individualized statements that make-up the perceived needs of agricultural education teachers regarding diversity and inclusion within their classrooms appears to support previous research indicating that these individuals must continue to become diverse in their roles as educators (LaVergne, Jones, Larke, & Elbert, 2012; Talbert & Edwin, 2008). Given the nature of increased diversity in agricultural education programs, it is recommended that agricultural educators actively seek culturally responsive pedagogies to ensure that their programs foster diversity inclusive atmospheres. This education can come from peer-to-peer-training (Talbert & Edwin, 2008), university level trainings (Johnson, Wilson, Flowers, & Croom, 2012), or district-level workshops (LaVergne, Larke, Elbert, & Jones, 2012). Respondents in this survey appeared to understand the context of Individualized Educational Plans. One implication from this finding is that agricultural educators have made strides in accompanying students with disabilities. This finding supports previous research highlighting the benefit of diverse populations in agricultural programs (Johnson, Wilson, Flowers, & 2012). Based on this implication, qualitative research should be conducted to examine the methods and strategies that teachers used in fostering diversity inclusive agricultural education programs.

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Beginning Agricultural Education Teachers' Perceptions of their Preservice Teacher Education Program

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Introduction

Researchers agree that the preservice teacher education programs have an impact on beginning teachers' sense of teaching efficacy (Whittington, McConnell, & Knobloch, 2006). Flores (2015) further noted that adequate preservice teacher preparation may influence teaching efficacy by reducing uncertainty about one's ability to perform teaching behaviors. Supporting this, Brown, Lee, and Collins (2015) found evidence that teachers' sense of efficacy increased when they had received learning opportunities that improved their teaching skills. Darling-Hammond, Chung, and Frelow (2002) reported teachers who felt better prepared were more likely to believe they could more effectively manage their classrooms while teaching all students to high levels. Conversely, teachers who felt underprepared were more likely to feel uncertain about their abilities to teach their students (Darling-Hammond, Chung, & Frelow, 2002) and less likely to remain in the profession (Coladarci, 1992; Evans & Trimble, 1986). Therefore, to be used as a factor to predict teaching efficacy, an examination of the perceptions of beginning agricultural education regarding their preservice teacher education program is warranted.

Theoretical Framework

Teachers' sense of efficacy, which is grounded in Bandura's (1986) social cognitive theory, refers to a "teacher's judgment of this or her capabilities to bring about desired outcomes of student engagement and learning (Tschannen-Moran & Woolfolk Hoy, 2001). Bandura (1986) indicated the environment surrounding an individual influences their behaviors and beliefs. Environmental influences, including instruction and modeling, modify human expectations, beliefs, and cognitive abilities. Bandura (1977) noted "most human behavior is learned observationally through modeling; from observing others one forms an idea of how new behaviors are performed" (p. 22). Within in a preservice teacher education program, students are provided opportunities to model appropriate teaching behaviors. Bandura's (1986) social cognitive theory was used to guide this study to describe the perceptions held by beginning agricultural education teachers toward their preservice teacher education program.

Methods

This descriptive study used survey research methods to summarize participant demographic characteristics and perceptions held by the respondents toward their preservice teacher education program. Data was collected using an internet-based instrument which contained two sections. In section one respondents were asked to use a five- point summated rated (Likert-type; 10 items) scale to rate their perceptions toward their preservice teacher education program. The instrument was researcher developed and was based upon the National Quality Program Standards for Secondary (Grades 9-12) Agricultural Education established by The National Council for Agricultural Education (2009). Section two consisted of demographic questions relating the teacher's age, gender, and years of experience.

The population for the study (N=199) included secondary agricultural education teacher in [STATE] and [STATE] who had not completed more than five years teaching agricultural education, and were licensed through an approved program. Teacher names and contact information were obtained from each state's department of education. Nonresponse error was controlled by comparing on-time (N=103) respondents to late (N=77) respondents (Lindner, Muphy, & Briers, 2010). A t-test for Equality of Means was yielded no significant differences

between the two groups on the four scales in the study; therefore, the data were combined, resulting in a final response rate of 83.4% (*N*=166). Data were collected using the internet survey provider SurveyMonkey® during June and July following the procedures outlined by Dillman et al. (2009).

Findings

According to the overall score for the scale (*M* = 3.47, *SD* = .80), the beginning agriculture teachers indicated their teacher education program adequately prepared them to teach agricultural education. The beginning teachers indicated they were well prepared to "pursue professional growth through continued participation in professional development," (*M* = 3.76, *SD* = 1.00) "deliver curriculum in an integrated model that incorporates classroom and laboratory instruction, experiential learning, and leadership & personal development," (*M* = 3.74, *SD* = .93) "provide students with opportunities for the development and application of knowledge and skills," (*M* = 3.74, *SD* = .91) and "assess student learning" (*M* = 3.73, *SD* = .88). On the other hand, the teachers indicated they were least prepared to "utilize advisory councils to determine areas for program improvement," (*M* = 3.09, *SD* = 1.14) and "manage students supervised agricultural experience programs." (*M* = 3.07, *SD* = 1.10). Although the data tended to be homogenous, a statistical difference was found between third year teachers and first and second year teachers regarding how well their teacher education program prepared them to teach within the three-circle model of agricultural education.

Conclusions, Implications, and Recommendations

The findings suggest beginning teachers viewed their preservice teacher education program adequately prepared them to teach. Although, as a group, the teachers felt well prepared to deliver curriculum in the traditional three-circle model, the differences between 1st and 2nd year teachers and 3rd year teacher cannot be ignored. The beginning teachers indicated they were least prepared to manage student supervised agricultural experience programs. As it relates to teaching efficacy, this finding is not surprising. Wolf (2011), noted beginning agricultural education teachers "were the least efficacious in the SAE domain" (p. 172). Since prior researchers have indicated adequate teacher preparation may influence teaching efficacy (Flores, 2015), "perhaps more emphasis should be placed on the SAE domain during teacher preparation and student teaching" (Wolf, p. 172, 2011). Doerfert (2011) noted teacher preparation programs must remain current to better prepare preservice teachers for entry into the profession. To remain current, teacher preparation programs should incorporate perceptions of recent graduates into their program evaluations in order to make the necessary revisions and updates to better prepare future teachers.

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Does Selection of the Animal Systems Pathway Influence the Type of SAE Students Choose? A Multi-State Analysis

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Introduction/Need for Research

Students enrolled in secondary agricultural science courses have the unique opportunity to apply what they learn in the classroom with hands-on experiences in the three-circle model of agricultural education (Croom, 2008). Supervised agricultural experiences (SAEs), allow students to further explore their interest area through entrepreneurship programs, research projects, or placement in an agricultural business. However, before a student chooses their SAE type, they must first choose their interest area. The National Council for Agricultural Education has developed an Agricultural Food and Natural Resources Career Cluster, and there are eight career pathways within the cluster allowing students to focus on their particular interests (National AFNR, 2015). The pathway focused on during this study is the Animal Systems Career Pathway.

After deciding on a career pathway that matches their interests, students can then examine and choose the type of SAE that will best fit their available resources. In order to assist students with this process, several online SAE inventories exist. Explore SAE is one such inventory and served as the platform for this research (Explore, 2015). Within Explore SAE, students may choose from five SAE types: entrepreneurship, exploratory, placement, unpaid placement, and research. It is important to note that unpaid placement is separated from a paid placement in the inventory to align Explore SAE with a popular web based record keeping system in agricultural education, The Agricultural Experience Tracker (AET) (2015). The purpose of this study was to evaluate the type of SAE students choose within the animal systems pathway.

Conceptual and Theoretical Framework

Conceptually, this study was designed to explore the tie between AFNR pathways and the type of SAE students select in Explore SAE. Theoretically, this study is grounded in experiential learning theory. Kolb (2005) states that learners experience a cyclical learning which includes abstract conceptualization, active experimentation, concrete experience, and reflective observation. When a student selects an AFNR pathway and then an SAE related to that pathway, each of Kolb's four modes of experiential learning are employed.

Methodology

The population for this study included all students who created an Explore SAE account from July 2014 to July 2015 and selected the Animal Systems Pathway. The included data were analyzed from students indicating an animal systems preference in the three states with the highest number of student accounts: Texas, Georgia, and Florida. The instrument used to collect the data was Explore SAE where students were asked to give their interest area and selected their SAE type.

Results/Findings

The results were divided by SAE type for each of the three states, and the results are given in Table 1. Frequencies and percentages were recorded for each of the five SAE types students chose within the Animal Systems Pathway.

Table 1

Frequencies and percentages of type of SAE selected in Animal Systems Pathway

	Florida		Georgia		Texas	
	n	*%*	*n*	*%*	*n*	*%*
Entrepreneurship	51	23.6%	77	19.5%	681	31.8%
Exploratory	28	13.0%	80	20.3%	296	13.8%
Placement	58	26.9%	109	27.6%	737	34.5%
Unpaid Placement	60	27.8%	106	26.8%	354	16.5%
Research	19	8.8%	23	5.8%	71	3.3%
Total	216		395		2139	

Conclusions

According to the percentages reported, the most common SAE type across all three states was placement. Unpaid placement had slightly more than placement in Florida; however, the difference is too small to make conclusions between the two. Entrepreneurship is more common in Texas than the other states, this is most likely due to the high participation in junior livestock shows. However, the placement SAE showed higher participation than entrepreneurship in all three states. We can therefore conclude that students interested in animal science are more likely to complete a placement SAE project than entrepreneurship. Research SAEs are chosen less frequently by students in all three states. This leads to the question, why are students who are interested in the animal systems pathway less interested in a research SAE? Further research is needed to explore this phenomenon.

Implications/Recommendations/Impact on Profession

The results of this study should be compared with similar data from The AET and other state specific recordkeeping systems to determine if students' interests in Explore SAE transfer over to actual SAE programs. By having a better understanding of the type of SAE programs students interested in the animal systems career pathway tend to choose, agricultural science teachers should be able to tailor their instruction to match the interests and needs of their students. Analyzing each pathway and SAE type may result in tailored programmatic approaches to SAE selection and development. Understanding the developmental process for SAE selection has implications for university faculty who train agricultural education teachers and state agricultural education staff who offer professional development for teachers.

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Evaluating the Impact of a Required Agricultural Mechanics Unit of Instruction on Pre-Service Teachers

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Introduction

The integrated three-component model of agricultural education which includes classroom/laboratory, FFA, and SAE programs (Croom, 2008) has been the model for many successful agricultural education programs. Many areas of study can be taught within the topic of agricultural education including animal science, horticulture, forestry, and agricultural mechanics. Recent studies have shown evidence that new agricultural education teachers feel less comfortable teaching agricultural mechanics than other areas of agriculture (Burris, McLaughlin, McCulloch, Brashears, & Fraze, 2010; Lester, 2012; McKim, Saucier, & Reynolds, 2010). Stripling & Roberts (2012) indicated that previous experience in a topic area such as agricultural mechanics increases self confidence in the given subject.

It is imperative that pre-service teachers are given the experiences needed to provide them with a high level of self-confidence to teach so they can become highly qualified teachers (Hubert & Leising, 2000). Highly qualified teachers are those who gained teacher certification and licensure, know their subject area, and are competent at teaching [the subject] (Darling-Hammond & Berry, 2006). To prepare pre-service teachers, a high quality teacher education program should include a high level of technical skill within the agricultural mechanics area of study. Miller, Kahler, and Rhealt (1989), found that the effectiveness of teachers is directly related to their confidence. The purpose of this study was to evaluate the self-confidence of pre-service teachers and examine the effects of teaching a unit of instruction focused on electrification in an agricultural mechanics course during the 12 week student teaching internship.

Conceptual Framework

Self-concept is a multidimensional element comprised of self-confidence, self-esteem, self-concept stability, and self-crystallization (Pajares & Schunk, 2001). Self-confidence is derived from the extent to which one believes one can produce results, perform tasks competently, and accomplish goals (Schunk, 2012). Self-esteem is the perspective one has of self-worth or acceptance of oneself (Robinson, 1991). Self-esteem and self-confidence are thus related leading to the belief that if one is capable of performing a task, they will subsequently increase personal self-esteem. High self-esteem will lead one to attempt more difficult tasks, subsequently enhancing self-confidence (Schunk, 2012).

Methods

In the spring semester of 2015, a group of 12 Agricultural Education pre-service teachers at [University] attended a required course on teaching agricultural mechanics. The 80 hour Teaching Agricultural Mechanics course focused on preparing the pre-service teacher for conducting and managing an agricultural mechanics laboratory prior to beginning the 12 week student teaching internship. The pre-service teachers enrolled in the course were asked to participate in the study on teaching a required unit of agricultural mechanics during their internship. After attending the course, the pre-service teachers completed a self-confidence instrument prior to their internship.

This study utilized a teacher confidence scale, which was developed by the researchers following the directions of Anita Woolfolk Hoy (Hoy, 2015). The instrument was comprised of 14 teaching skills related to electrification with a six point Likert-like agreement scale. The instrument was pilot tested with 14 sophomore agricultural education students at [University], which resulted in a Cronbach's α of .95. Content validity was established by a pannel of experts comprised of five agricultural education professors with 85 years of combined experience teaching agricultural mechanics.

The pre-service teachers were given the objectives for the required agricultural mechanics unit of instruction that included electron theory of electricity, basic fundamentals of electricity, electrical tool identification, electricity calculations, drawing wiring diagrams, and basic wiring skills. During the pre-service teaching internship, a pretest was given to the high school students in the cooperating school classroom to set a baseline for student knowledge on electrification. Once the pre-test was completed the pre-service teachers began teaching the unit on electrification. When the unit of electrification was completed the students were given a post test. After the pre-service teachers taught the electrification unit they attended a mid-term meeting at [University]. During this time the pre-service teachers completed a post-survey in relation to their self-confidence to their teaching of the electrification unit, turned in their lesson plans, and participated in a focus group.

Results

The survey results provide evidence that there were positive changes in the level of confidence after the completion of teaching of the electrification unit during the pre-service teaching internship. The questions related to teaching electron theory and calculating electricity usage had the largest change. The skill that the pre-service teachers showed the least amount of confidence in teaching was drawing of wiring diagrams ($M = 3.44$). Identifying basic electrical tools ($M = 5.55$) was the area the pre-service teachers felt most confident to teach.

To identify any statistically significant differences between the pre-internship survey and the post-internship survey we ran a *t* test. Two statistically significant differences were found. With the questions related to teaching electron theory and how to calculate electricity usage in volts, amps, watts, ohms, and kilowatt hours. Teaching electron theory was statistically different in the scores for pre-internship confidence ($M = 3.30$, $SD = 0.82$) and post-internship confidence ($M = 4.33$, $SD = 1.22$) conditions; $t\ (17) = 2.18$, $p = .044$. Calculating electricity usage was statistically different in the scores for pre-internship confidence ($M = 4.11$, $SD = 1.26$) and post-internship confidence ($M = 5.33$, $SD = 0.86$) conditions; $t\ (16) = 2.38$, $p = .030$.

Conclusions & Recommendations

The results of this preliminary study led to a few conclusions, however they should not be generalized beyond the population of the n=12 class of pre-service teachers at [University]. It can be concluded that the student teachers exhibited a higher self-confidence after teaching the required unit of agriculture mechanics. The researchers recommend examining the current agricultural mechanics curricula at [University] in order to enhance the areas of low self-confidence. It is recommended that this study be continued for consecutive years to determine if changes in the program affect the outcomes of the confidence of pre-service teachers. To provide a larger impact study on pre-service teacher's needs, the study should be broadened to include other institutions that have agricultural education pre-service programs with agricultural mechanics courses to help provide a better understanding of the needs of pre-service teachers.

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Extension: Building Common Ground Between Leaders of Agriculture and Natural Resources and Public Needs

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Introduction/Need for Research

According to the Food and Agriculture Organization of the United Nations (FAO, 2009), the year 2050 is projected to host one of the world's most unprecedented occurrences: a population of over nine billion people. An increase in population this large will impose many implications affecting individuals spanning from local to national communities. One of these implications involves the growing trend of the urban sector of the country (FAO, 2009). Along with an increase in urbanization, additional factors such as food security and climate change have been brought to the attention of industry professionals (FAO, 2009). Perhaps one of the largest concerns developing in response to this global issue is the general public's awareness of the problem (FAO, 2009). The combination of an increased trend in urbanization along with the growing population of individuals over the age of 65 will ultimately call for extension educators to adapt their methods. However, without a proper assessment for identifying the needs and perceptions of residents at the local and county level, extension educators will be unable to effectively plan and implement programs targeting and prioritizing the needs of the general public (Harder, Lamm & Strong 2009). A higher level of perceived camaraderie between extension educators and agricultural and natural resource leaders will also be helpful in boosting the overall credibility of the extension programs developed (Johnson, Lilja, & Ashby 2003). The purpose of this study was to identify the issues agricultural and natural resource leaders deem as important for the public to inform extension program planning. The objectives are to: prioritize the level of importance for specific issues influencing agriculture and natural resources, determine the level of awareness the average Florida resident has on specific issues facing agriculture and natural resources, and provide a comparison between what industry leaders deem as important issues compared to perceptions of Florida residents' awareness.

Theoretical Framework

The theoretical framework for this research was adapted from the needs resolution process developed by Harder et al. (2009). Boyle's (1981) work supports the purpose of this study as he describes needs as the gaps between what exists and what is desired. As a result, the purpose of a needs assessment is to identify and prioritize these gaps to create high quality programs (Harder et al., 2009). This model for the needs resolution process begins with a disequilibrium requiring a needs assessment (Harder et al., 2009). The direct response from the individual perspective is to either act and resolve the issue, or provide no action by continuing in disequilibrium. In the same way, the needs assessment will either cause an organization to act by increasing efficiency, synergy, and morale; or not act: leaving the employees to become disenfranchised with the needs assessment process (Harder et al., 2009).

Methodology

A descriptive survey was developed and reviewed by a panel of experts. The survey instrument was administered separately to two leadership groups of alumni from the University of Florida: Agriculture Leadership Training Group (ALT) and Natural Resources Leadership Training Group (NRLT). The number of usable responses from this study included 105 responses from ALT members and 77 responses from NRLT members. Response rates obtained from these two groups were 50% and 35%, respectively. Respondents were compared to the population and significant differences did not exist. The first part of the instrument presented the respondents with specific agricultural issues requesting they use a five-point Likert Scale to rate the

importance of each issue (1 - *Not Important*, 5 - *Extremely Important*). The second part requested the respondents rank their perception of the general public's awareness of the same issues using a similar five-point Likert Scale (1 - *Completely Unaware*, 5 - *Extremely Aware*). The data was analyzed using the Statistical Package for the Social Sciences version 22. Averages were calculated for each issue and chi squared tests were used to identify significant differences.

Results

The results from the data revealed the respondents' perception of the public's awareness on specific issues was low overall (Table 1). In other words, the public was on average between somewhat aware and aware of the specific issues. The issues of greatest importance were water quality, water supply, and food safety. The issues the public was perceived to be most aware of were immigration, water quality, and climate change. Overall, the most significant differences between the leaders' perception of importance and perception of public awareness were in workforce preparedness, food safety, climate change, and endangered species (Table 1).

Table 1

Importance versus public awareness of issues

Issue	Leaders' Perception of Importance *M (SD)*	Leaders' Perception of Public Awareness *M (SD)*	χ^2
Workforce Preparedness	3.43 (0.93)	1.77 (0.737)	29.645*
Food Safety	4.17 (0.99)	2.48 (0.916)	23.599*
Climate Change	3.46 (1.26)	2.60 (0.826)	20.861
Endangered Species	3.24 (1.10)	2.45 (0.829)	20.184
Water Supply	4.59 (0.67)	2.48 (0.978	18.992
Animal Welfare	2.99 (1.04)	2.25 (0.893)	18.175
Immigration	3.86 (0.97)	2.76 (1.055)	16.694
Habitat/Ecosystem Preservation	3.64 (1.03)	2.45 (0.822)	16.334
Renewable Energy	3.44 (1.02)	2.34 (0.827)	14.945
Urban/Rural Interface	3.41 (0.96)	1.74 (0.732)	12.072
Imports/Exports	3.59 (0.91)	1.78 (0.742)	10.405
Food Security	4.02 (1.01)	1.87 (0.862)	6.387
Invasive Species	3.89 (0.93)	1.82 (0.757)	6.711
Pest/Disease Control	4.06 (0.87)	1.86 (0.778)	5.700
Water Quality	4.45 (0.72)	2.62 (0.938)	4.515

Note: $*p < .05$.

Conclusions/ Implications/ Recommendations/ Impact on Profession

The data identified gaps referenced by Boyle (1981) between what is needed in extension programming and what exists in terms of level of issue importance versus perceived public awareness of that issue. The FAO's (2009) prediction about a gap in urban/rural interface was supported by the data (Table 1). The top four issues showing significant issues in Table 1 could be viewed as interworking parts encompassed in the subject of urban/rural interface (Libby & Dicks, 2002). A recommendation made from this data to beneficially impact the extension profession would be to create educational material for the public on urban/rural interface tying together concepts from the agricultural and natural resource sustainability perspective including these identified topics. Developing material targeted at increasing public awareness of

urban/rural interface could assist in increasing understanding of the unprecedented population in 2050. Research could then explore the effect of the educational materials on public knowledge.

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How Are You Going to Keep Them on the Farm? Identifying which College Majors Return the Most Graduates to Rural Areas

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Introduction/Theoretical Framework

Rural areas throughout the United States have seen an increase in the out-migration of educated young adults in what has been called the "rural brain drain" (Artz and Yu, 2009). Rural youth often attend college and major in disciplines with few if any clear connections to rural employment opportunities (Meece et al., 2013). Marre (2014) determined the largest rural employment sectors for college graduates were educational and health services (41.5% of jobs), manufacturing (8.9%), professional and business services (8.5%), and wholesale and retail trade (7.9%); agriculture accounted for 3.4% of employment for B.S. graduates. According to Human Capital Theory, individuals invest in education with the expectation this investment will result in higher future incomes (Tan, 2014). Thus, majors not well represented in rural job markets would be expected to retain smaller percentages of rural graduates in rural areas (Tan, 2014).

Purpose

The purpose of this study was to compare all agriculture majors with the 17 largest non-agriculture majors (by total graduates) to determine if there were significant differences in the percentage of rural and metropolitan students living in rural areas after graduation.

Methodology

The data set for this study was provided by the University of Arkansas Alumni Association in March 2014 and included parents' zip codes at the time the student first enrolled in the university and the graduates' current zip code for all graduates in 2007 and 2008 (N = 6,211). According to the Alumni Association, mailing addresses, including zip codes, are updated every 90 days to guarantee recipients receive all mailings at their current addresses. Personal identifiers were not provided in the data set in order to maintain the anonymity of graduates. For this study, data from all agriculture majors and for the 17 largest non-agriculture majors were analyzed.

Zip codes were used to classify pre-college address and current address as either rural area or metropolitan, based on the Rural-Urban Commuting Area (RUCA) zip code approximation database (Rural Health Research Center [RHRC], n.d.). Zip code areas are classified on a scale from one to 10, with ranges one through three classified as "metropolitan" and codes four through 10 classified as "rural" (USDA-ERS, 2012).

Results/Findings

A majority of both agriculture (60.8%) and non-agriculture graduates (51.9%) originally from rural areas were living in rural areas six or seven years after graduation (Table 1). A significantly higher percentage of rural agriculture graduates lived in rural areas after graduation, $\chi^2(1) = 5.32$, $p = .02$. Twelve of the 17 largest non-agriculture majors returned over one-half of their rural graduates to rural areas, with return rates for apparel studies, transportation/logistics, and accounting exceeding 60%. The rural return rates for poultry science and horticulture exceeded 80%. Although only small percentages of either metropolitan agriculture (19.5%) or non-agriculture (10.9%) graduates lived in rural areas, the rural residency percentage was significantly higher for agriculture graduates, $\chi^2(1) = 11.94$, $p = .0005$. Among metropolitan agriculture graduates, rural residency exceeded 20% for animal science, agricultural education, communications and technology, and poultry science graduates; among non-agriculture graduates only transportation/logistics exceeded 20%.

Table 1. *Agriculture and non-agriculture graduates residing in rural areas after graduation*

Major (Sector)	Graduates from Rural Areas		Graduates from Metro Areas	
	n	% Currently Rural	*n*	% Currently Rural
		Non-Agriculture Majors		
Marketing	153	51.0	254	9.1
Journalism	104	37.5	212	13.7
Biology	151	54.3	120	6.7
Nursing	101	56.4	132	9.8
Psychology	80	57.5	133	9.1
Elementary Education	91	45.0	112	11.6
Kinesiology	96	52.1	100	9.0
Management	105	50.5	87	4.6
Communication	87	41.4	102	6.9
English	77	49.4	101	11.9
Accounting	60	60.0	107	11.2
Mechanical Engineering	80	51.2	60	15.0
Political Science	55	43.6	73	12.3
Apparel Studies	57	66.7	69	13.0
Transportation/Logistics	49	63.3	62	22.6
Chemistry	45	51.1	65	7.7
Total Non-Agriculture	1391	51.9	1789	10.9
		Agriculture Majors		
Ag. Business	61	60.7	43	18.6
Animal Science	42	69.0	28	21.4
Crop, Soil, & Env. Sci.	24	3.5	17	11.8
Ag. Ed.,Comm., & Tech.	21	71.4	16	25.0
Food Science	15	20.0	16	6.2
Poultry Science	18	83.3	5	40.0
Horticulture	12	83.3	32	12.5
Total Agriculture	193	60.8	157	19.5

Conclusion/Implications/Recommendations

Overall, significantly higher percentages of agriculture graduates originally from both rural and metropolitan areas lived in rural areas as compared to non-agriculture graduates. However, some non-agriculture majors (apparel studies, transportation/logistics, and accounting) retained rural graduates at rates comparable to the average for all agriculture majors. This is somewhat consistent with the availability of rural bachelor's level jobs as described by Marre (2014). Thus, a variety of majors in addition to agriculture provide viable opportunities for rural graduates to return to rural areas. These results indicate the rural brain drain, while partially caused by the loss of rural graduates, is largely a function of the failure of rural areas to compete for significant percentage of metropolitan college graduates. Further research is needed to examine metropolitan students' perceptions of career opportunities and lifestyle amenities in rural areas.

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Identifying challenges of Early Career Agents in Virginia Cooperative Extension

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Introduction

Virginia Cooperative Extension hired 100 new agents from 2011 to 2014. This study was initiated to determine the continuing professional education needs for these early career agents. The research team worked with Extension administration to develop a series of recommendations to support career longevity in a collaborative environment.

Conceptual Framework

Extension educators serve an important role in providing engagement of Land Grant Universities. Extension professionals are expected to begin their careers with the knowledge and skills necessary to develop and facilitate educational programs and experiences for youth and adults in local communities (American Association for Agricultural Education, 2001). Early career extension agents have different competencies and continuing professional education needs than their more experienced counterparts (Benge, Harder & Carter, 2011; Brodeur et al., 2011; Hibberd, Blomeke, & Lillard, 2013; Smith, Hoag, & Peel, 2011).

Methodology

A total of twenty-seven participants participated in four focus group sessions. To identify potential participants the research team requested that the four district directors each identify those agents in their district who had been hired within the last three years. The research team then randomly selected and invited seven potential participants from each of the four districts. As agents declined the team invited the next individuals on the randomly generated list until there were six or seven participants in each of the four focus groups. Focus group questions were developed through use of a priori investigation of existing literature and further developed through review by a panel of experts. Focus group sessions were recorded, transcribed and coded for analysis. A summary of quotes was developed for each theme and reviewed by three members of the research team to identify key areas for recommendation.

Findings

Findings reported relate to career longevity, collaboration environment, work-life balance, access to extension specialists, job expectations, professional development plans, mentoring, perceived similarities/differences between early career and more experienced agents

Career Longevity: Issues of career longevity related to concerns agents have when they see people who were in their cohort at new agent training leave Extension.

Collaboration Environment: Early career agents expressed challenges in partnering with more senior agents or others outside their program areas.

Work-life Balance: Work-personal life balance issues related to agents meeting personal needs while working long hours. Agents expressed a lack of separation between their professional and personal lives.

Access to Extension Specialists: Agents expressed challenges in identifying, knowing what to expect and how to initiate interaction with specialists in developing their programs.

Job Expectations: Agents shared concerns about isolation in rural communities and salary levels, in addition to the number of hours and amount of travel required to do the job.

Professional Development Plans: There was a great deal of confusion among participants related to the expectation to have professional development plans.

Mentoring: Mentoring expectations were unclear to early career agents who felt that their mentors either were uncertain of how to approach mentoring or lacked the time to address it appropriately.

Differences between early career agents and more experienced agents: The primary differences that early career agents perceived were their interest in having a family and time to enjoy them and interest in utilizing more active teaching methods.

Conclusions

Immediately following data analysis, the summary was shared with district directors and a program leader as basis for discussion. Their feedback was utilized by the research team in setting priorities. Recommendations were submitted to the State Extension Leadership for possible incorporation. These actions have been or are in the process of being implemented:

Career Longevity: The manner in which employee retention data is being collected will be improved. Exit interviews are also being emphasized to identify reasons agents leave the organization.

Work-Life Balance: Need for clarification of policies and expectations related to providing a supportive work environment that recognizes the need for early career agents to develop skills in successful work-personal life integration.

Access to Specialists: A document is being developed that will identify roles and expectations for communication and interaction between agents and specialists.

Professional Development Plans: A task force is being established to develop a formalized professional development program in which agents will establish goals and develop a plan to attain both non-degree and degree opportunities that connects to performance evaluation processes.

Job Expectations: Celebrate the experience of more tenured agents and provide online resources that market the benefits associated with an Extension career. Develop an annual calendar to assist an agent in planning their first year. Develop a “survival kit” for new agents.

Mentoring: A new process is being introduced which will have District Program Leadership Teams overseeing a year-long mentoring process for new agents using multiple mentors and providing mentoring training.

Differences between early career more experienced agents: A diversity program is currently focusing on intergenerational issues related to work environment and clientele interaction in system-wide training.

Collaboration Environment: The committee suggested the development of a system-wide survey to establish baseline data of agent needs for skills in collaboration and development of collaboration strategies. This recommendation has been tabled for future consideration.

Recommendations

This study has been instrumental in providing insight into identification of areas for organizational improvement in order to strengthen relationships and provide enhanced skills and experiences for early career agents. The responsiveness of the leadership to make changes indicates a desire to meet the needs of these agents while also highlighting the flexibility of the organization to address needs that have evolved as a result of changes in the work force. Future study will be needed to evaluate the implementation of the recommendations.

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Identifying Themes to Guide Curriculum Development for the Poultry and Egg Education Project (PEEP)

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Introduction/need for research

The Centers for Disease Control (2011) estimates that approximately one in six Americans (~ 48 million people) are affected by foodborne illnesses, and approximately 128,000 of these people are hospitalized and 3,000 die. Both *Salmonella* and *Campylobacter* are two of a handful of pathogens that cause the most foodborne illnesses, hospitalizations, and deaths each year (2011). According to the United States Department of Agriculture (2015), raw and undercooked poultry and eggs are often associated with *Campylobacter* and *Salmonella* caused illnesses. Consumers can reduce their risk of foodborne illness from these pathogens by safely purchasing, storing, handling, and preparing poultry products and eggs.

The multidisciplinary, multi-institutional Poultry and Egg Education Project (PEEP), funded by a 5-year USDA National Food and Agriculture Institute (NIFA) Agriculture and Food Research Initiative (AFRI) grant (Project Number TENX-2011-06512), seeks to reduce illnesses from *Salmonella* and *Campylobacter* pathogens by conducting bench science research on best practices for safe handling and use of poultry and egg products and creating science-based educational programming for consumers. This poster will describe key findings of a content analysis of microbiological and consumer-focused research conducted as part of the PEEP USDA AFRI project.

Conceptual Framework

Objective one of the PEEP USDA AFRI project was to characterize consumers' behavior and understanding of safe poultry practices. Objective two was to address the risk of crosscontamination when purchasing, handling, and cooking poultry products. Objective three was to develop and test educational programs on poultry and egg purchasing, handling, storing, and prepping (Godwin, 2014a).

Developing a conceptual framework to guide and organize educational activities and research was the purpose of this content analysis. The first objective of the study presented here was to review completed reports and identify egg and poultry food safety themes. The second objective was to analyze themes in the research to determine the focus of curriculum development.

Methodology

A content analysis was conducted on the research and reports created by the PEEP project in its first 2.5 years, January 2013 to July 2015. Content analysis is a research methodology that seeks to identify and evaluate themes to better understand their meaning (Krippendorff, 2013). First, project summaries and corresponding articles were reviewed in entirety. There were 26 total articles, presentations, and posters from research outlined in the four project summaries that were used as the cases for this study (Godwin, 2015; Godwin, 2014a; Godwin, 2014b; Godwin, 2013).

Egg and poultry food safety themes were identified and labeled with key words written on a sticky note serving as a bookmark. A note with a number was also placed on each article, poster or presentation to give it a case number. A Microsoft Excel document was created to input the main themes or subthemes and page numbers they were mentioned. The theme, subtheme, and page number(s) were entered into separate columns in Excel. If one of the themes or subthemes

was mentioned in the article, presentation or poster at least once, it was counted as one frequency. Frequencies and percentages were calculated for each theme and subtheme.

Results/findings

The three main themes identified in the project summaries and articles were 1) shopping, 2) handling and storage, and 3) cooking behaviors. The theme of handling and storage had the highest number of frequencies (*f* = 43) followed by the theme of cooking behaviors (*f* = 34) and the theme of shopping behaviors (*f* = 31). Under the theme of handling and storage, three almost equally mentioned subthemes were *storage of poultry and eggs at home (f = 14), cross contamination (f = 15), and hand washing (f = 14).* For the Cooking Behaviors theme, *proper thermometer use* was mentioned most (*f = 15*). Regarding the Shopping Behaviors theme, the most frequent subthemes were *separating poultry from other foods when shopping in the grocery store (cross contamination) (f = 11) and utilizing grocery store meat plastic bags (f = 9).* The poster will indicate frequencies and percentages of times the themes/subthemes were mentioned in all of the project studies.

Conclusions

The research presented in the PEEP project summaries (Godwin, 2015; Godwin, 2014a; Godwin, 2014b; Godwin, 2013) presented certain areas where consumers are lacking in food safety practices. These areas include the following practices when dealing with raw poultry and shell eggs:

- Utilize hand sanitizer and plastic bags provided at meat sections in grocery stores
- Understand safe egg purchasing
- Follow recommended storage practices for raw poultry
- Thaw poultry correctly, including not washing or rinsing raw poultry in sink
- Wash hands properly
- Store eggs and poultry at home properly
- Prevent cross contamination at grocery store and at home
- Understand thermometer use and proper food temperatures for egg dishes and poultry
- Cook egg yolks and whites until firm
- Do not consume raw or undercooked eggs

Implications/recommendations/impact on profession

There is a need to educate consumers about safe egg and poultry practices. Specific lessons will be organized around the themes, and include the identified subthemes and the specific areas where consumers are lacking in food safety practices based on the PEEP studies. Curriculum lessons should also focus on these specific practices to educate consumers about the safe methods for handling eggs and poultry and therefore try to reduce the amount of foodborne illnesses and deaths. Researchers are currently developing age appropriate lessons based on findings, and this curriculum will be shared with profession subsequently.

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Mechanical Aptitude of Post-Secondary Agricultural Education Majors

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Introduction

Understanding a future employee's aptitude for understanding and applying mechanical principles helps future employers make hiring decisions. Many organizations use testing as a component of their employment selection process (Bennett, 1994). The ability to comprehend mechanical principles is an important skill within the field of agricultural education and is a content area we regularly see taught within the agricultural education curriculum, both at the secondary and post-secondary levels (Lawver, 1992; Saucier & Krysher, 2014). Testing of these skills allows educators and employers to measure the extent to which students or employees have mastered mechanical comprehension. This also helps to identify who needs more training.

Previous studies of differences in mechanical comprehension found that males usually perform better than females (Lunneborg & Lunneborg, 1985; Sapitula & Shartzer, 2001). Of those who received bachelors in general agriculture in 2012, 48% were female, while in agricultural education there were more females than males. We find an even larger divide when we look at the 12% of females who completed an undergraduate degree in engineering (National Center for Education Statistics, 2014). It is important that agricultural education majors have a level of mechanical aptitude to be successful in their future careers.

Framework

The purpose of this study was to determine the mechanical comprehension level of undergraduate agricultural education majors using the Bennett Mechanical Comprehension Test (BMCT) (Bennett, 1994). The theoretical framework for this study was based around the theory of planned behavior (Azjen, 1985), the theory of planned behavior was designed to exhibit the relationship between informational and motivational influences on behavior (Connor & Armitage, 1998).

Methods

The purpose of the BMCT is to measure the ability to perceive and understand the relationship of physical forces and mechanical elements in practical situations (Bennett & Cruikshank, 1942). The BMCT is an aptitude test and functions differently from an achievement test. Aptitude is used to measure a person's ability for future reasoning and acquisition of knowledge (Ransdell, 2001). The BMCT is composed of 68 items that are illustrations of simple, frequently encountered mechanisms. For each question the participant reads a prompt, examines an illustration and chooses the best answer from three choices. The Flesch-Kincaid formula indicates readability at the sixth-grade level. Previous studies have shown strong support for the validity of the BMCT (Kolz, McFarland & Silverman, 1998; Muchinksy, 1993) and reliability resulted in a Cronbach's alpha of 0.71.

The BMCT was administered to college agricultural education students currently taking an introduction to agricultural mechanics course. The range of scores possible for the BMCT is 10 – 90. The raw scores students received were recorded and compared between demographic characteristics. We also compared raw scores within percentile rank scores of various professions. Students in this study (n = 30) ranged in grade level from Freshmen (n = 2, 7%),

Sophomores (*n* = 6, 20%), juniors (*n* = 15, 50%) and Seniors (*n* = 7, 23%). Students identified themselves as Caucasian (*n* = 21, 70%) and Hispanic (*n* = 9, 30%). Due to the nature of this study, caution should be taken when generalizing the findings or when making inferences beyond the sample population.

Findings

The mean of the participants BMCT scores was 43 (*SD* = 7), ranging from 29-56 (see Table 1). In comparison to the BMCT normative data, the undergraduate participants' scored higher than heavy equipment operators (*M* = 24.1, *SD* = 9.4); their BMCT scores were lower than the other professions' normative data.

Table 1
Participants' Scores Compared to BMCT Normative Data

Group	*M*	*SD*
Engineer	52.1	9.0
Welder	47.4	8.9
Automotive Mechanic	46.0	11.0
Heavy Equipment Operator	42.1	9.4
Undergraduate Participants	43.0	7.0

In regard to the demographic characteristics of the participants, male students (*M* = 45.71, *SD* = 5.4) earned higher BMCT scores in comparison to female students (*M* = 36.61, *SD* = 6.5)(See Table 2). Among grade classification, freshmen (*M* = 52.50) earned the highest BMCT scores.

Table 2
BMCT Scores by Demographics

	f	*M*	*SD*
Gender			
Male	21	45.71	5.4
Female	9	36.61	6.5
Grade Level			
9th	2	52.50	0.70
10th	6	44.83	5.56
11th	15	41.27	6.05
12th	7	42.43	9.25

Conclusions & Recommendations

The participants were found to have a moderate level of mechanical comprehension. The BMCT scores varied but no pattern was found in between the mechanical comprehension and students' grade classification. To increase the BMCT scores, it is recommended that the secondary students receive more technical education at the secondary and post-secondary level, to prepare them to effectively teach agricultural mechanics. Male students had a higher level of mechanical comprehension in comparison to female students, consistent with previous studies (Forston, 1991; Sapitula & Shartzer, 2001). To create a source of comparison, the BMCT instrument

should be administered to secondary students enrolled in higher-level agricultural mechanics courses, to see if their mechanical comprehension levels increase with more experience in agricultural mechanics courses.

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Middle School Agricultural Education Experiences Related to High School Agricultural Education Enrollment in Georgia

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Introduction

Middle school agricultural education programs provide students with a variety of outlets to put their knowledge to the test, combining agricultural concepts learned in the classroom with academic content. Currently agricultural education is only serving a fraction of the students who could be part of an educational program of this capacity (Myers, Dyer, & Breja, 2003). However, according to Hillison (1994) "in recent years, the middle/junior high school program has become a popular one and represents the fastest growing area of agricultural education" (p.4). This increase should motivate teachers and educational researchers to discover the experiences at the middle school level leading to high school enrollment, thus establishing an increase in the number of students who will benefit from agricultural education (Cupp & Weaver, 1994; Herren & Denham, 1990). The need for increasing enrollments in school-based agricultural education (SBAE) is among the priorities of the agricultural education profession (Doerfert, 2011).

Conceptual Framework

This study is based on cognitive and social psychology, involvement, and experiential learning theories. Cognitive and social psychology supports the link between student attitudes and beliefs (Bandura, 1986; Vygotsky, 1962; Dewey, 1938) that could result in student enrollment in agricultural education programs. Positive experiences in the middle school program could lead to enrollment in high school (Cheek, Arrington, Carter, & Randall, 1994). The conceptual model for this study included four factors affecting student enrollment decision in high school: classroom/lab instruction, SAE, FFA/leadership development, and attitude. A paucity of recent research exists that specifically pertains to middle school experiences in agricultural education and how they may influence ninth-grade SBAE program enrollment decisions. If middle school students are expected to continue their study in SBAE, then it is important to identify middle school experiences that may be related to high school enrollment (Silverberg, Warner, Fong, & Goodwin, 2004; Hughes & Barrick, 1993; Phipps, Osborne, Dyer, & Ball, 2008; Knight, 1987; Sutphin and Newsom-Stewart, 1995; Reis & Kahler, 1997).

Methodology

The purpose of this study was to describe the experiences of middle school agricultural education students who subsequently enrolled in a 9th grade SBAE program in Georgia. The research objectives included: 1. Determine the background and experiences of 9th grade agricultural education students who had been enrolled in middle school agricultural education; and 2. Determine to what extent middle school experiences in agricultural education influence a student's decision of enrollment in a 9th grade agricultural education course.

Population and Sample. The population for this study was all 9th grade students enrolled in an agricultural education course in Georgia. A purposive sample was utilized to select one high school program from each of the six geographic areas of Georgia from the list on the Georgia Agricultural Education website (Bridges, 2014). The research was conducted by surveying 9th grade students in the six counties that had both middle school and high school agricultural education programs.

Instrumentation, Data Collection, and Data Analysis. The Dillman, Smyth, and Christian (2009) five-step process for the administration of group questionnaires guided the instrumentation and data collection process. The instrument included a list of experiences identified as components of the middle school agricultural education program in the Georgia middle school exploring

agricultural education curriculum and the leadership opportunities outlined by the Georgia agricultural education program. The instrument was pilot tested with a similar group of students and reviewed by agricultural education faculty for reliability and validity, respectively; no needed changes were identified. Selected demographic information was also collected. The study was approved by the Institutional Review Board at the University of Florida.

Findings

Objective One: Of the students (N=108) who completed the instrument, 53 (49%) were male and 55 (51%) were female, and ranged in age from 14 to 16 years of age, with most (44%) being 15. The participants reported diverse backgrounds, with 33 (30%) being from a rural/farm area, 47 (44%) from a rural/non-farm area, and 28 (26%) from an urban area. Most (60%) reported a family member with a career in agriculture, and most (76%) had been enrolled in one or two years of SBAE. Participants had a variety of SAE programs: 42 (39%) entrepreneurship; 27 (25%) placement; 35 (32%) research, and 4 (4%) exploratory.

Objective Two: Students indicated the level of influence that 46 middle school experiences had on their enrollment in high school agricultural education, utilizing the following scale: (1) negative influence, (2) slightly negative influence, (3) no influence, (4) slightly positive influence, and (5) positive influence. For Classroom and Lab Experience, students rated hands-on learning as the biggest influence, followed by learning about FFA opportunities, and learning how agriculture affects life. Learning about the horticulture industry, forestry and natural resources, and plant science were rated the least positive influences. For FFA/Leadership Development, students indicated being an FFA member was the biggest influence, followed by participating in animal science career development events (CDEs), and attending chapter meetings. Serving as a chapter officer, participating in agricultural mechanics CDEs, and attending National FFA convention were rated the least positive influences. For SAE, students indicated that hands-on learning through SAE was the biggest influence, followed by [my] SAE program, and learning recordkeeping skills. Receiving recognition for [my] SAE, showing livestock, and entering [my] SAE in the agriscience fair were rated the least positive influences.

Conclusions

Georgia students currently enrolled in high school SBAE indicated the 10 middle school experiences that had the most influence upon their enrollment decision. Six of the top ten were from classroom, three were from SAE, and one was from FFA/leadership. Six of the top ten experiences are process experiences (how to learn) and the other four content experiences (what to learn). Middle school agricultural educators need to provide educational opportunities that will help the student learn how to learn while also learning about agriculture.

Implications/Recommendations

These results provide a better understanding of the experiences with the greatest influence on a student's enrollment decision. As noted by Cupp and Weaver (1994), Herren and Denham (1990), and Hedrich (1985), these results help to clarify and emphasize the importance of middle school agricultural education in increasing enrollments in high school agricultural education. Middle school agricultural educators should utilize this list to better understand what experience provides the most influence upon their students to continue enrollment as they enter high school. State staff and teacher educators could utilize these results to gain a better

understanding of the experiences each student should have during involvement in middle school agricultural education. Future research should be conducted to determine other factors that contribute to enrollment decisions and sustained enrollment for multiple years and to investigate why students choose *not* to enroll in high school agricultural education.

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Perceptions of Home Community: Do Rural and Metropolitan Students Differ?

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Introduction/ Conceptual Framework

The exodus of the most academically talented rural students to metropolitan areas has been dubbed the "rural brain drain", and poses a threat not only to the social and economic vitality of rural communities, but to their very survival (Artz & Yu, 2009). This loss of 'the best kids' (Carr & Kefalas, 2009, p. 29) leaves many rural communities with lower levels of social and human capital (Gibbs, 2005), decreasing and aging populations (Monk, 2007), decreasing tax bases (Gibbs, 2005), and struggling local economies (Petrin, Schafft, & Meece, 2014). According to Ferry (2006), perceptions of the home community have an impact on youth's decisions to either remain in or return to their rural home communities. Exploration of college students' perceptions of their home communities may provide insight regarding how [State] rural communities can market attractive aspects of their communities in order to encourage youth to return upon graduation.

Purpose & Methodology

The purpose of this study was to describe and compare rural and metropolitan students' perceptions of the importance of and their satisfaction with selected aspects of their home communities. The sample (N = 109) for this survey design study consisted of undergraduate agriculture and human environmental sciences students enrolled in three sections of an introductory-level computer applications course taught during the Fall 2014 semester. This course was purposively selected because students from a wide variety of majors and, therefore, community types were enrolled. Ninety-four (86.2%) students provided usable responses. The researcher-developed instrument contained 19 items describing community characteristics; for each statement, respondents rated the importance of the community characteristic and their satisfaction with the characteristic using a 4-point Likert-type scale (1 = *Not important/satisfied*; 4 = *Very important/satisfied*). Instrument stability was established using students (n = 21) enrolled in a different introductory agriculture course; coefficients of stability of .61 (satisfaction) and .62 (importance) were obtained and deemed acceptable for this study (Miller, Torres, & Lindner, 2005). One additional item requested respondents to provide the zip code for permanent home address. Respondents were classified as either rural or metropolitan based on the Rural-Urban Commuting Area zip code approximation database (RHRC, 2015).

Results/ Findings

Slightly over one-half (54.2%) of respondents were from rural communities. Because importance and satisfaction data were not normally distributed, Kruskal-Wallis non-parametric tests were used to identify significant ($p < .05$) differences between student groups. Rural students rated the importance of 13 of the 19 community characteristics significantly lower than did metropolitan students (Table 1). Rural and metropolitan students rated their satisfaction with only three of 19 community characteristics differently. Rural students were significantly less satisfied with the availability of good-paying jobs and the cost of living in their home communities. Conversely, rural students were significantly more satisfied with the community factor, "People who share my religious values," than were metropolitan students. Both groups of students placed high importance on access to high-speed internet service and cell phone coverage; both were satisfied with these two aspects of their respective local communities.

Table 1. *Rural (*n = 53*) and Metro (*n = 41*) Students' Perceptions of Importance and Satisfaction with Selected Aspects of Their Home Communities*

	Importance[a]			Satisfaction[b]		
	Rural	Metro	χ^2	Rural	Metro	χ^2
Good Paying Jobs	2.38	3.05	13.01***	3.74	3.93	4.14*
Clean Environment	2.92	3.27	3.33	3.40	3.56	1.37
Places for people my age to hang out	2.28	2.93	8.81**	3.11	3.22	0.17
Quality schools and teachers	2.96	3.49	8.79**	3.58	3.76	0.66
Good stores and shopping facilities	2.43	3.39	18.72***	3.23	3.59	3.27
Cultural opportunities	2.00	3.15	20.09***	3.15	3.49	2.64
Many changes to get ahead	2.40	3.12	13.16***	3.55	3.60	0.02
People share my views	2.57	3.07	4.68*	3.30	3.25	0.15
People who share my religious values	3.00	3.22	0.76	3.28	2.88	4.53*
Tolerance of different religions/cultures	2.55	3.24	10.25**	3.42	3.49	0.00
Indoor entertainment	2.29	3.32	19.33***	2.83	3.09	1.50
Agencies to help people solve problems	2.25	3.05	17.50***	2.92	3.17	1.44
Land that can be used for recreation	2.94	3.00	0.06	3.42	3.17	2.00
Home access to high-speed internet	3.47	3.66	1.45	3.75	3.75	0.11
Internet café or coffee house	2.64	3.40	9.53**	2.66	2.90	0.71
Good preschool and childcare options	2.90	3.44	8.93**	3.26	3.66	0.09
Reasonable cost of living	3.30	3.41	0.00	3.51	3.76	4.66*
Cell phone coverage	3.40	3.63	3.22	3.58	3.80	1.97
Opinions of people your age are valued	2.58	3.05	6.00*	3.36	3.51	0.56

[a]1 = Not important; 2 = Somewhat important; 3 = Important; 4 = Very important. [b]1 = Not satisfied; 2 = Somewhat satisfied; 3 = Satisfied; 4 = Very satisfied.
*p<.05. **p<.01. ***p<.001.

Conclusions/Implications/Recommendations

Both rural and metropolitan students identified access to high-speed internet connection at home as the most important characteristic of a community, a characteristic about which both groups were satisfied. Students from metropolitan areas rated the importance of more than one-half of the community characteristics significantly greater than rural students, suggesting these characteristics may not be as readily available in rural communities. This may suggest that the brain drain gap increases as rural students become aware of metropolitan opportunities (Artz & Yu, 2009; Carr & Kefalas, 2009: Gibbs, 2005). While the groups did not differ in their perceived level of importance of a reasonable cost of living, metropolitan students were more satisfied with their home communities' abilities to provide this opportunity. This finding suggests their abilities to obtain high-paying jobs may be higher than those in rural communities, as rural communities typically boast lower costs of living than metropolises. Confirming this implication, metropolitan students were significantly more satisfied with their abilities to find good paying jobs; however, they also held greater importance in this characteristic than their rural peers. The sample for this study was restricted to freshman rural and metro students. Therefore, it is likely that upper classmen would have different perspectives. Recommendations for further study include describing how rural students' perceptions of importance change as they spend time attending college in metropolitan areas.

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School Based Agricultural Entrepreneurship Education Programs for Rural Youth: A Synthesis of Current Literature

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Introduction

The average age of principal farm operators in the U.S. was over 58 years old, an increase of 1.2 years since the 2007 census (USDA, 2014). America's rural youth have shown ambivalence toward agriculture and, for the most part, are not returning to the farm (Bajama, Miller, & Williams, 2002; Brooks, Lee, Berry, & Toney, 2010; Conroy, 2000; Holtz-Clause & Jost, 1995). School based agricultural education has had a long history of engaging youth in agriculture and entrepreneurial ventures through supervised agricultural education programs and other curricula that has engaged rural youth in entrepreneurial thinking (Guthrie, 2013; Phipps, Osborne, Dyer, & Ball, 2008). For nearly twenty years an award was given through the National FFA Organization called the Agri- Entrepreneurship Award, but this award was cancelled in 2010 (K. Keith, July, 2015, personal communication). Nationally and internationally, entrepreneurship and entrepreneurship education has received major attention, likely because of the powerful economic progress that comes from entrepreneurs (Farm Bureau, 2015; Markley, Mackey, & Luther, 2005; Morris, Kuratko, & Cornwall, 2013; Valerio, Parton, & Robb, 2014). Yet, in school based agricultural education, little has been written recently about agricultural entrepreneurship education programs. A return to agricultural entrepreneurship education is needed, in part, to help rural youth see agriculture as a viable career. This study synthesized current literature concerning school based agricultural entrepreneurship programs from around the world.

Conceptual Framework

The conceptual framework for this review was based on the work of Valerio, Parton, and Robb (2014) who developed a conceptual framework in order to review entrepreneurship education and training programs from around the world. The conceptual framework for this study included variables for student and teacher characteristics, program characteristics that include design and delivery, experiential learning and content, curriculum and wrap around services; intended outcomes; all set within a learning environment; and finally all of these are set within a local, national and international context.

Purpose & Objective

The purpose of this study was to synthesize available literature on rural youth agricultural entrepreneurship education programs to create a relatively holistic view of the current state of agricultural entrepreneurship education programming for rural secondary students. The objective of the study was to synthesize available literature on a researcher developed framework.

Methods

Key words such as rural, youth, agriculture, and entrepreneurship education were used to find primary and secondary literature sources from the internet and library sources. Priority for inclusion in this review was given to literature published within the last 20 years. Literature was grouped into categories based on the conceptual framework, established *a priori*. One researcher determined the relevancy and inclusion of the literature for this study, and, as such, may have introduced his own bias, which is an acknowledged limitation of this study.

Results

Context - The national and international context has been described by major reports and literature that described rural areas and youth in agriculture. Several major reports have

described the entrepreneurial ecosystem around the world from a national or regional perspective such as the Global Entrepreneurship Monitor (GEM) Global Report issued by the Global Entrepreneurship Monitor (2015).

Teacher Characteristics - Generally, teachers' personal entrepreneurial experience or training did have an impact on what was taught and its effectiveness in the entrepreneurship education classroom (Ruskovaara & Pihkala, 2012; Seikkula-Leino et al., 2010). Teachers' are open to teaching entrepreneurship but lack experience (Ali et al., 2009; Ruskovaara & Pihkala, 2012).

Student Characteristics- Students are often uninterested in agriculture or rural areas; but may have aspirations for entrepreneurship (Alibaygi & Poya, 2011; Ball & Wiley, 2005).

Program - Overall, entrepreneurship education programs around the world, including the U.S. are highly variable (Cho, 2015). Experiential learning (Kolb, 1984) is a key component of design and delivery for many entrepreneurship education programs (Cooper, Bottomley, & Gordon, 2004; Dhilwayo, 2008; Morris et al., 2013; van der Sijde et al., 2008). Curriculum and content has focused on developing entrepreneurial mindsets and capabilities through student-established mini-corporations and home-based entrepreneurship programs (Markley et al., 2005; Morris et al., 2013; Oosterbeek et al., 2010; Valerio et al., 2014). Wrap-around support services provided to students were funding, mentors, information communication technology, business incubators, trade fairs, competitions (European Commission on Enterprise and Industry, 2009; IFAD, 2015; Ngurukie & Deshpande, 2013; Nor, 2015; Owualah, 1999).

Intended Outcomes - Overall, limited evaluations have been conducted (Cho, 2015; Valerio et al., 2014). Collectively, several studies used outcomes such as entrepreneurial mindsets and capabilities as well as business formation from entrepreneurship programs (Elert et al., 2015, Regele & Neck, 2012; Valerio et al., 2015).

Conclusions and Recommendations

The purpose of this study was to synthesize available literature on rural youth agricultural entrepreneurship education programs. Teachers have shown interest in teaching entrepreneurship, but lack prior knowledge for effective teaching. Common support services were providing funding, mentoring, access to business incubators and competitions. Program evaluations have rarely been conducted. However, some evaluations have demonstrated improved entrepreneurial mindsets and capabilities in program participants.

Recommendations:

- Study the best practices and characteristics of exemplary programs.
- Develop curricula using experiential learning that teaches entrepreneurial mindsets and skills.
- Create a consistent and coherent set of programs nationally or regionally.
- Provide teacher training on entrepreneurship education.

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School Board Members' and Administrators' Perceptions of the CASE Curriculum

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Introduction/ Theoretical Framework

Curriculum integrating science, technology, engineering, and mathematics (STEM) has become a hot button item lately in secondary education. Pressures to move in the direction of a richer STEM-based curriculum has been applied from federal legislation (i.e., American Competiveness Initiative, 2006). According to Kuenzi (2008) "When compared to other nations, the math and science achievement of U.S. pupils and the rate of STEM degree attainment appear inconsistent with a nation considered the world leader in scientific innovation" (p. 2). Core curriculum classes, such as science and math classes, have been a focus for the improvement of STEM competencies; albeit, the integration of STEM concepts has been apparent in the field of agricultural education. The push for STEM in agricultural education is partially in response to the National Research Council (2009) which indicated agricultural careers in the future will require more skills and knowledge related to STEM. It can also be argued that the foundation of STEM have been deeply rooted in agricultural education all along (Hillison, 1996). In fact, in some states secondary students can enroll in agricultural science classes to earn science credit (Conroy & Walker, 2000; Thompson & Balschweid, 1999). The agricultural science teachers, teaching science credited classes, need a curriculum which will embrace the unique aspects of the agricultural industry, while attending to the rigor of a STEM education. One possible curriculum choice is the Curriculum for Agricultural Science Education (CASE). The CASE (2014) curriculum provides a foundation of science; the CASE lessons are aligned to the National Science Education Standards, as well as other core content (Carraway, Ulmer, Burris, & Irlbeck, 2015).

Previous research has focused on science (Carraway et al., 2015; Spindler & Greiman, 2013) and math (Beaudoin, Johnston, Jones, & Waggett, 2013) teachers' perception of STEM integration in career and technical education. Although, the teachers in this study found value in agricultural STEM integration, they lack the authority to make decisions on curriculum adoption. The majority of financial and educational decisions are left up to the local boards of education, superintendents, and individual school principals (A Guide to Decision–Making in Schools, 2010; Structure of U.S. Education, 2008). When reviewing literature, school administrator's perceptions of STEM education, and more specifically CASE curriculum, a lack exist. This research study sought to determine school board member's and superintendents' perceptions of the CASE curriculum.

Methodology

This descriptive research study used a survey design; the survey instrument utilized in this study was developed by Carraway et al. (2015). The instruments were administered at CASE booth at the [STATE] Association of School Boards, in [CITY]. The school board members and administrators who participated in this study were asked to review an animal science CASE lesson before taking the survey instrument. Using a number randomizer, lessons were randomly assigned to each participant. After reviewing the lesson, the participants were asked to take the instrument on Qualtrics; the instrument included 17 four-point Likert-type items (1 = strongly disagree, 4 = strongly agree) inquiring about their perception of the lesson, and 15 demographic questions. School board members and administrators who participated were entered to win one of six, $100 gift cards. Although the original creator established the reliability (r = .69) of the

instrument (i.e., Carraway et al., 2015), a post hoc test was conducted to ensure the instrument's reliability in this context, which resulted in a Cronbach's alpha of .81.

Results/ Findings

The majority of school board members and administrators who participated in this study were not currently (72%) or formerly (64%) associated with agricultural production/business. Similar results were indicated in regard to 4-H membership, where 16 (64%) indicated they were not involved in the youth organization. When asked about their previous involvement in secondary agricultural education, 13 (52%) indicated they were enrolled in agricultural education for at least one year. In regard to the agricultural connectedness score of the participants, 68% (n = 17) of the participants indicated a connection to agriculture.

Eight items on the instrument sought to measure the participants' perceptions of the CASE curriculum. "If students learn this content they will perform better in science class" (M = 3.72, SD = 0.54) and "Students at my school would be interested in an agriculture class structured in this manner" (M = 3.72, SD = 0.68) were the two items which the participants indicated the highest means. The reverse coded item, "Students in my school do not learn academic concepts in agriculture classes" had the lowest mean of 2.65 (SD = 1.03). The summated score for school board members and administrators' perceptions of the CASE curriculum was 3.47 (SD = 0.31), which indicates moderately high agreement with these items. Of the 9 items measuring the participants' perceptions of the implementation of the CASE curriculum, "teachers and administrators, at my school, would support an agriculture class taught with the teaching philosophies of this lesson" was the item with the highest agreement (M = 3.84, SD = 0.75). The two items which received the lowest level of agreement were the items indicating their science (M = 2.60, SD = 1.20) and agricultural science (M = 2.64, SD = 1.20) teachers lack the knowledge to teach this curriculum. The summated mean score for the participants perceptions of implementing the curriculum was 3.44 (SD = 0.41).

Conclusions/ Recommendations

Although school board members and administrators did not indicate a high level of current involvement in the agricultural industry, past participation in secondary agricultural education bolstered their agricultural connectedness score. This connection to agriculture might imply that they will be more willing to support agricultural education curriculum, such as CASE. The participants not only indicated they perceived the curriculum to be science related, they also felt this curriculum would help students' performance in their science classes. It can be implied that the evident presence of science relation is due to the CASE curriculum's alignment with the Science Education Standards. The school board members and administrators indicated they would support the CASE curriculum at their school, and would allocate funds to support a CASE class. Understanding the school board members' and administrator's perceptions of the CASE curriculum is important in the adoption process of this curriculum, but it is also necessary to determine the perceptions of other administrators (CTE directors, principals, assistant principals) who make curriculum adoption decisions. Further research should be conducted to determine CTE directors' perception of the CASE curriculum. It is also recommended that this research study be duplicated with the utilization of a probabilistic sample.

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Survey of 1862 Land-Grant University Agricultural Leadership Academic Programs

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Introduction

Research in the agricultural education and agricultural leadership disciplines have been inconsistent (Connors and Swan, 2006). Kaufman, Rateau, Ellis, Kasperbauer, and Stacklin (2010) summarized how needs assessments are the first step in working to evaluate leadership education programs. By soliciting input from agricultural leadership and education experts, one might better understand career focus and placement for graduates, objectives of leadership programming, courses taught related to agricultural leadership, and perceptions held by associates within the discipline (Morgan, King, Rudd, & Kaufman, 2013). A recommendation from Williams, Townsend, and Linder (2005) indicated a qualitative study should be conducted to include known leaders within the field to better understand knowledge of the discipline.

The purpose of this study was to identify and characterize the current agricultural leadership academic programs in colleges of agriculture, food, human, life or environmental sciences at the undergraduate and graduate levels. The study supports the National Research Agenda Priority 5: Efficient and Effective Outcomes, which addresses the needs to develop effective academic programs to advance the career, developmental, and academic needs of diverse learners (Doerfert, 2011). Four research objectives guided the larger study. This manuscript reports the data collected via survey related to these specific research objectives:

1. Identify all 1862 land-grant universities with agricultural leadership academic programs;
2. Determine demographics of agricultural leadership faculty; and
3. Describe identified agricultural leadership programs.

Conceptual and Theoretical Framework

Ajzen's Theory of Planned Behavior and Bloom's Taxonomy provided the framework of the study. Ajzen's Theory focusses on intentions that represent the motivations of an individual in relation to his or her conscious plans or decisions to begin a certain behavior (Ajzen, 2005). According to Conner and Armitage (1998), the Theory of Planned Behavior has experienced a high degree of success in predicting varieties of behaviors and serves as a solid theory for creating effective design decisions in producing change behaviors. Additionally, Bloom's Taxonomy is popular among many academic disciplines as a form of understanding how people learn or master a given subject in a process. With history traced back to 1956, Bloom's Taxonomy has served as a model for academic and human growth (Forehand, 2005). Therefore, Bloom's Taxonomy can be used as a model for academic programming growth.

Methodology

There are fifty 1862 land-grant institutions with a college related to agriculture, food, life, human or environmental sciences (APLU, 2015). Each college's website was searched for undergraduate or graduate degree, specialization, concentration or option in leadership. Each university that offered programs where students could receive academic credit for a program related to agricultural leadership were contacted (N=26). Of the 26 identified schools, 22 (n = 22) universities agreed to participate in the study. University administrators such as department heads and academic deans provided names of faculty working in an agricultural leadership program to participate in an electronic survey containing 10 questions. The study was approved by IRB. Descriptive statistics were used to discuss the objectives.

Results / Findings

Regarding objective one, a total of 26 (N=26) 1862 universities currently have agricultural leadership-related academic programs housed in a college of agriculture, food, life, human, or environmental sciences. These universities included Arizona, Auburn, Florida, Georgia, Hawaii, Idaho, Illinois, Kentucky, Minnesota, Mississippi State, Missouri, Nebraska, New Mexico State, North Carolina State, Ohio State, Oklahoma State, Oregon State, Penn State, Purdue, Rutgers, South Dakota State, Tennessee, Texas A&M, California-Davis, Virginia Tech, and West Virginia. All identified universities offered a major, minor, concentration, or specialization in agricultural leadership-related programs. Of the identified universities, 15 of the programs (68%) were housed in an academic department related to agricultural education, communications, leadership, or extension education, while seven (32%) were described as interdisciplinary programs.

Objective two related to respondent demographics. Of the 26 identified universities, respondents from 22 (*n*=22) institutions participated in an electronic survey for a response rate of 84.6%. Respondents included 16 males and six females. Additionally, participants' job titles included program coordinator (*n*=1), as well as assistant (*n*=8), associate (*n*=4), and full professors (*n*=9). The average respondents had been teaching agricultural leadership for a total of nine years with 36% (*n*=8) teaching five years or less, 36% (*n*=8) teaching six to ten years, 9% (*n*=2) 11 to 15 years, and 18% (*n*=4) teaching for 20 or more years.

Objective three described characteristics of the agricultural leadership programs. Among the 22 participating universities, agricultural leadership programs have existed for an average of 17 years, with 18% (*n*=4) existing in the last five years, 18% (*n*=4) six to 10 years, 23% (*n*=5) 11 to 15 years, 9% (*n*=2) 16 to 20 years, 9% 21 to 25 years, and 23% (*n*=5) existing for over 25 years. Undergraduate enrollment in programs ranged from 15 to 700 students, with an average of 136 undergraduate students per program. A total of 20 institutions (91%) require an internship or capstone experience before graduation, and the average number of courses required to meet degree requirements is five leadership-related courses. In terms of teaching support, programs had an average of four faculty devoted to teaching leadership courses. Two programs had faculty who shared leadership teaching responsibilities and no faculty solely devoted to teaching leadership courses, while larger programs reported up to 16 leadership faculty members. A total of seven universities offered agricultural leadership graduate programs, where graduate student enrollment ranged from two to 75 students.

Conclusions and Recommendations

The researcher's data revealed 52% (*N* = 26) of 1862 land-grant institutions currently have agricultural leadership-related programs. It is interesting to note many of these programs (*n*=10) are located in southern region of the U.S. From the data, it can be reasonably inferred there is a large chasm in relation to program size, number of required courses, longevity of programs, and experience among faculty members. Recommendations for future research include conducting a research study to encompasses all faculty members at 1862 land-grant schools or even broadening the study to include all agricultural leadership programs in higher education.

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Which Way Did They Go? Determining College Choice of Louisiana School-Based Agricultural Education Students

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Introduction

College choice research has largely focused on examining how the interactions between student characteristics, goals, and achievements influence students' attitudes toward attending college, as well as their selection of a particular institution (Hossler & Gallagher, 1986). The process of college choice has been framed, historically, by three perspectives: (a) sociological, (b) psychological, and (c) economic (Bergerson, 2009; Paulsen, 1990). "The sociological perspective focuses on college choice as part of the status attainment process, with emphasis on individual background factors that influence the decision of whether and where to go to college" (Bergerson, 2009, p. 3). The psychological perspective is focused on how students' perceptions of institutional climate influence their choice of college (Paulson, 1990). Economically, college choice is viewed as an investment decision (Paulson, 1990). Per this perspective, students weigh the benefits of particular institutions against the costs of attendance. Choices are, therefore, made based on the economic evaluation of benefits of postsecondary education (Paulson, 1990).

Hossler and Gallagher's (1986) model of college choice can be used as a comprehensive theoretical framework to examine these three aspects within a single model. According to Hossler and Gallagher (1986), the college choice process involves three phases, including (a) the predisposition phase, (b) the search phase, and (c) the choice phase. The predisposition phase takes into account the interaction of factors that influence students' predispositions toward college attendance. These factors may include students' background characteristics (e.g. socioeconomic status or ability), the influence of significant others (e.g. parents, friends, or highschool counselors), institutional characteristics, and educational activities (Hossler & Gallagher, 1986,). As a part of the search phase, students seek information about institutions. During this stage, students likely have desire to attend college but are undecided as to which college to attend. However, students may not find adequate information during this search or may not find a college they perceive as desirable, which could result in students choosing the non-college option. The search activities of both students and institutions play a role in the outcome of this stage of the process (Hossler & Gallagher, 1986). The final phase is the choice phase, during which students evaluate their options and narrow their choice to a particular institution (Hossler & Gallagher, 1986).

Purpose and Objectives

The purpose of this descriptive study was to determine the college and major choice of Louisiana school-based agricultural education students (SBAE). The objectives of this study were to (a) determine where college-bound SBAE students enrolled and (b) identify how many of the students chose an agriculturally related major.

Methodology

Data for this study were collected as a part of the Louisiana FFA Association annual report. The online questionnaire was sent to all (N = 230) agriculture teachers, of which 169 (73.5%) completed the report. The data of interest for this study was where the agriculture teachers reported their 2014 graduates were attending college, as well as their intended major. For the purpose of this study, only data pertaining to students attending 4-year, in-state institutions were reported.

Results/Findings

Table one depicts the college choice college choice of Louisiana SBAE students, as well as the whether or not their major was agriculturally related

Table 1
College and Major Choice of Louisiana School-Based Agricultural Education Students

College		Major Choice		
	f	Ag. Related	Non-Ag Related	Unknown/ Undecided
Southwest regional university	72	23	37	12
1862 land-grant	51	17	24	9
State technical university	38	16	15	7
South-central regional university	32	2	25	5
Northwest regional university	28	1	25	2
Northeastern regional university	16	3	10	3
Southern regional university	14	0	11	3
Southeastern regional university	12	0	7	5
1890 land-grant	6	1	1	4

Conclusions/Recommendations

The largest number of students pursuing both agriculturally related and non-agriculturally related majors planned to enroll in the southwest regional university upon graduation, whereas the lowest number of students planned to enroll in the 1890 land-grant university. Additionally, teachers reported that 50 students were undecided about their academic major. Considering that the largest number of students reported plans to enroll at the southwest regional university, it could be beneficial to conduct a future study to examine the institutional factors that positively influence students' decision to enroll in this institution. Moreover, in light of the extremely low number of students planning to enroll at the 1890 land-grant institution, future research should seek to examine why students may be deterred from enrolling at this institution. As per Hossler and Gallagher (1986), students who are undecided in their college choice may be struggling with the search phase. As such, a follow-up qualitative study could be conducted with students who were undecided in their choice to examine their search progress and further assist students in gathering the information needed to make the choice. According to Hossler and Gallagher (1986), students may eliminate an institution during the search phase due to lack of accurate information about institutions or lack of awareness of the various institutions to which they could apply. As such, Louisiana universities should increase efforts to convey information to students in the state, rather than hope students will find the information on their own. Lastly, since events which shape the predisposition phase have not been well understood (Hossler & Gallagher, 1986), it could be beneficial to conduct future research to examine relationships between factors associated with the predisposition phase and college choice.

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