Innovative Poster Session Proceedings

North Central Region Conference of the American Association for Agricultural Education
October 4-6, 2018
Fargo, ND

Twenty innovative posters were received with 14 accepted for presentation (70% acceptance rate).

Poster Reviewers:
Thank you to the following reviewers for generously and professionally donating their time. Without their commitment, the poster session would not be possible.

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Collegiate Leadership Competition Team

Introduction:

Leadership education in higher education oftentimes falls in one of two categories: 1. Classroom education (i.e., theories and terms) without much hands-on practice, or 2. Out of classroom hands-on experiences without much information about theories and terms. Few experiences are comprehensive enough to contain adequate amounts of both components. This was the situation at Iowa State University.

To address this issue, we experimented by subscribing to the Collegiate Leadership Competition. "Collegiate Leadership Competition (CLC), a nonprofit college leadership program founded in 2015, creates a dynamic practice field where student leaders can apply what they're learning in a context that stretches them to the boundaries of their leadership knowledge, skills, and abilities. CLC makes leadership a real, tangible experience for future leaders" (collegiateleader.org, 2018).

The purpose of this innovative idea is to share our experience recruiting, educating, and coaching a team of students to compete in the Collegiate Leadership Competition as a means to provide students with a rich, authentic experience that provides both classroom and out-of-class experiences.

How it worked:

To meet the objective of strengthening the link between classroom education and skill development/practice, a 3-credit experimental course was developed. The course was designed using the CLC curriculum, which is centered around ten acronyms focused on concepts, skill development/practice (i.e., L.E.A.D.E.R.S.H.I.P., F.O.L.L.O.W., S.O.L.V.E., S.T.Y.L.E.S., T.E.A.M.S., I.N.F.L.U.E.N.C.E., C.O.N.F.R.O.N.T., S.T.R.E.S.S.O.R.S., E.T.H.I.C.S., and C.O.N.F.L.I.C.T.). Theoretical content (i.e., Transformational Leadership (Bass & Riggio, 2006), Emotional Intelligence (Levy-Shankman, Allen, & Haber-Curran, 2015), and Social Change Model (HERI, 1996)), was integrated into the curriculum. Each class period consisted of learning an acronym and related theory, as well as hands-on activities.

An example of this integration was learning about teams, using the T.E.A.M.S. acronym (**T**rust, **E**motions, **A**ccountability, **M**ember norms, and **S**mall wins). CLC curriculum provided the base level of knowledge about teams by exploring the acronym and the meaning behind each of the components. Theories related to Emotional Intelligence (Shankman, Allen, & Haber-Curran, 2015) are key to working in teams and are the foundation of this acronym. These theories were examined using reading assignments and class discussion. In addition, a scaffold approach was used, which culminated in a trust fall, to experience various levels of trust, emotions, accountability, member norms, and small wins.

Formative assessment included weekly peer learning assignments where class members were paired with another class member for reading and reflective questions, class participation and instructor observation of interaction and skill development. Summative assessment was completed with a two-part final paper. Part one consisted of a reflection of their strengths and

weaknesses, including their own assessment, instructor feedback, and competition judges feedback. The second part of the assessment required students to apply the leadership content with their background in teacher education. Each student developed a lesson plan of how they would integrate one of the acronyms into their future curriculum.

Results to date:

The team competed in the Midwest Collegiate Leadership Competition in April. The two-day competition consisted of six, forty-five minute challenges where each team member was randomly assigned to lead one task. Each team member received extensive feedback on their process as well as the product. While the team had hoped to place higher than they did in the competition, each team member believed that they had learned from the experience.

- "Thanks so much for teaching this class this year. It was a great time. I learned so much about working with a team and about myself."
- "I enjoyed and learned something every class period and had a blast traveling to Kansas. I strongly encourage the department to do it again next year."
- "This class helped me think about how I will teach leadership in my classroom in the future. I can't just assume that students are becoming better leaders because they are in FFA."
- "This class challenged me to think about how I interact with others and how they may view me differently than what I intend."
- "I liked seeing how our team formed from the beginning of the semester to the end. It was just like we were studying in class."
- "I look forward to teaching leadership to my students. I have some good information to help me prepare."

Future plans:

We have chosen to continue with this project for a second year. Our goal is to reach additional students by recruiting more students to the class. In addition, the students who participated spring of 2018 are planning to offer workshops to our undergraduate Agricultural Education club using the materials and information they learned.

Costs/resources needed:

Collegiate Leadership Competition Curriculum and contest – 1900.00
Travel to regional competition – 980.00

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Enhancing the Pre-Service CASE Training Experience with Visiting Professionals

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Enhancing the Pre-Service CASE Training Experience with Visiting Professionals

Introduction and Need for Innovation

Previous work done at Texas Tech University (TTU) has shown the benefits of CASE training at the pre-service level. Although the work at TTU was completed with training in Agricultural Science – Animal, much of the data gives insight into the benefits for preservice training in all areas of CASE. In a semester long institute, students indicated that they "learned strategies for integrating science into agriculture, became familiar with CASE, and gained confidence in their ability to integrate science in their classrooms" (Carraway, et al., 2015, p. 95). Additionally, the students became advocates for CASE with populations outside of the university setting. Students knowledge in the content (Animal Science) and in science were assessed prior to the semester and after the semester. Statistically significant gains were found in both (Carraway, 2015). CASE training integrated into the preservice instruction has a positive outcome on future teachers' knowledge, ability, and confidence to teach science.

Kansas State University is a Curriculum for Agricultural Science Education (CASE) Affiliate Institution. Current faculty at Kansas State University were some of the first university personnel to work with CASE, starting in 2010. In the fall of 2016, the Agricultural Education program began integrating the CASE certification of pre-service teachers during the semester prior to student teaching. While the integration has been successful, the faculty determined there were elements that should be improved. When summer CASE Institutes are offered, current agriculture teachers (i.e. Lead Teachers) teach them. When CASE is integrated into the preservice curriculum, it is difficult to bring current high school teachers to campus due to their teaching schedule. Instead, trained faculty members must teach the institute material. In an effort to include current teachers in the pre-service training program, a "Visiting Professional" program was initiated at Kansas State University.

Methodology

This program created Visiting Professional days to teach the pre-service CASE Certification program. The CASE training focused on the Introduction to Agriculture, Food, and Natural Resources (AFNR) course. As a curriculum, AFNR is an easy fit in a high school freshmen introductory course. Most of the graduates from Kansas State University will teach an introductory class, so it was determined this would best serve graduates, while also creating a foundation for all of the CASE pathways that a teacher may work toward in the future. Current CASE certified teachers who wanted to be considered for the program had to complete an application indicating their availability and the specific lessons they were interested in facilitating.

In addition to teaching the pre-service teachers, the Visiting Professional was encouraged to visit a facility or department within the College of Agriculture while they were on campus. This professional development opportunity allowed current teachers to deepen their own content knowledge and make new connections to faculty at Kansas State University. It also allowed current teachers the ability to improve their own program and curriculum. The inclusion of the professional development component allowed this model to benefit all invested parties, pre-service teachers, practicing teachers, and existing agriculture programs.

The Fall 2017 program started in August by sending applications to current certified CASE AFNR teachers in Kansa asking certified teachers to apply to be a Visiting Professional during the fall semester. Next, teachers were selected and assigned a day and topic(s) to teach. During the months of September and October, the Visiting Professionals taught, or team-taught with university faculty, the CASE lessons to the pre-service teachers. In November, the 19 pre-service teachers were assigned a local school, specific class, and a CASE lesson(s) to teach in order to practice the skills and knowledge gained from the Visiting Professionals.

Results

The on-campus class met twice each week during the fall semester, with the last two weeks having more meeting time to match the required hours for certification. Visiting Professionals taught during 8 of the 20 class meeting times during the Fall 2017 semester. To expand the pre-service teacher experience even further, the pre-service teachers selected lessons to teach to high school students in seven area agriculture programs. Each pre-service teacher taught two CASE lessons for two days at the same school. This allowed them to apply the information gained from working with the Visiting Professionals to a genuine teaching experience. The total population impacted by the project during the 2017-18 school year included 19 pre-service teachers, 17 High school agriculture teachers (eight as Visiting Professionals and nine as local high teaching site hosts) and high school students from 19 different student teaching sites during the Spring 2018 semester. Outcomes for the program included: increased teaching efficacy for preservice teachers, increased connection of preservice teachers to in-service teachers and stronger connection between Kansas State Agricultural Education and current classroom issues.

Future Plans/Advice to Others

An application was provided to the current CASE teachers in Kansas and the interest was higher than the opportunities available to teach, in the future the number of teaching opportunities for Visiting Professionals will be expanded from eight to ten. Based on positive feedback from both the Visiting Professionals and the pre-service teachers, the program will continue for the up-coming school year and be improved by providing additional times for the visiting professionals to teach and purchasing more equipment and supplies for the pre-service teachers to take into the high school classroom they guest-teach the CASE lesson in.

Costs

Funding provided by a grant from Dupot Pioneer for travel, hotel, meals, and an honorarium.

Visiting Professionals				
Substitute Teacher Expenses	$75/day	10	$750	
Mileage	$150 (avg.)	10	$1500	
Meals	$25/day	10	$250	
Teacher Stipend	$100/day	10	$1000	
Hotel	$100/day	3 (appx. 1/3 will need a hotel)	$300	
Pre-Service Teachers Teaching CASE in local schools				
Pre-Service Teacher Mileage to teaching sites	$100 (avg.)	7 teaching sites with 2-3 teachers assigned per site	$700	
CASE lab equipment for Per-Service teachers to use in schools	$750	Additional teaching supplies	$500	
GRAND TOTAL				$5,000

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Implementing Principles of Community in the Ambassador Program

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Implementing Principles of Community in the Ambassador Program

Introduction/Need for Innovation

In July of 2005, a student government-appointed committee drafted six principles that exemplified the kind of community that Iowa State University could and should aspire to be. These principles sought to inspire a higher level of respect, open mindedness and community among the university community and included, *respect*, *purpose*, *cooperation*, *richness of diversity*, *freedom from discrimination*, and *honest and respectful expression of ideas*. The *Principles of Community* were subsequently endorsed by key campus groups and leadership. However, awareness and intentional implementation varied across campus.

The role of out-of-classroom experience is oftentimes perceived as an opportunity for students to increase their social and personal growth and is overlooked as an opportunity for valuable learning and skill development. Researchers and practitioners have suggested that exposure to a wide variety of out of classroom experiences provide concrete experiences for students to learn new concepts and should not be overlooked as opportunities to reach desired outcomes (Ewing, Bruce, & Ricketts, 2009; Foreman & Retallick, 2012). Foreman and Retallick (2013) suggested that faculty and staff should work in a partnership with student leaders to create meaningful educational activities as a part of out-of-classroom experiences. This collaboration must be intentional.

The mission of the college ambassador program is to assist the college in reaching their undergraduate recruitment goals. The program has competitive membership and a tiered-committee structure designed to help the group reach their goals. The ambassador program has been utilized as an out-of-classroom laboratory where leadership was intentionally taught and practiced for over a decade. The purpose of this innovate idea poster is to describe how a college ambassador program implemented the university's principles of community.

Program Description:

The 2018-2019 school year was an opportunity to challenge students in new ways. During a brainstorming and goal-setting meeting held the week before classes started, members of the executive officer team recommended a focus on respecting differences and an increased understanding of the purpose of the organization by all ambassadors. While the students didn't label their ideas as *Principles of Community*, advisers recognized the similarities and helped the students make that connection. The executive officer team and advisers developed an action plan to integrate the *Principles of Community* into the ambassador organization. The executive officer team took ownership of the initiative and provided the leadership. The group decided to focus on each of the principles for two weeks during the fall semester.

For each of the principles, the process was as follows:

- Leadership Team: The ambassador leadership team meets weekly and is comprised of a representative from each of the six committees. During week 1 of each principle, the chair facilitated an activity during leadership team to introduce the concept and help members see relevance for themselves and the ambassador organization.
- Committee meetings: Ambassadors are assigned to serve on one of the six committees, which met the following week and the Leadership Team representative shared the information with their respective committees. Leadership team members were encouraged to emphasize the role the specific principle had on their committee goals and success.

- Leadership Team: During the following Leadership Team meeting, members reported back on their committee meeting discussions and one group was chosen to talk about that Principle at the main meeting with all 100 ambassadors the following week.
- Main meeting: All of the ambassadors meet as a large group every two weeks. At each meeting, one of the leadership team members talked about the concept and highlighted why this concept is important to their committee.

New ambassadors were chosen in October and a training was held for them in November. The chair led an in-depth activity with them to make them aware of the *Principles of Community* and begin to define the culture of ambassadors as one that values differences. Each spring, ambassadors hold a day and a half training retreat. The executive officer team developed and implemented two sessions for that retreat. *Telling Your Story* was a session that encouraged ambassadors to think about what experiences and characteristics made them unique and how that could be useful interacting with prospective students and their families. *Answering Difficult Questions* provided ambassadors a guideline for answering questions and an opportunity to apply that guideline to answer difficult questions concerning inclusion. Some of the scenarios/questions dealt with LGTBQ+ housing, International faculty members, and non-production agriculture majors.

In addition to these training sessions, the *Principles of Community* were kept in the forefront of ambassador's minds during the spring semester while planning activities and interacting with prospective students.

Results to Date/Implications:

- Ambassadors, not a part of the executive officer team, talked about *Principles of Community* during discussions related to activity planning and recruitment, indicating that they understood the principles and were able and had a desire to apply them.
- Ambassadors were better able to communicate the inclusivity values of the college to prospective students.
- Because of the involvement of ambassadors in their academic departments (i.e., committees, learning communities, and departmental clubs), this initiative has the potential for impact beyond the students themselves and the ambassador program.

Advice to Others:

- The success of this initiative was dependent on it being a student-driven initiative with support from the advisers.
- Context of the principles was important. Focusing on how each principle was related to ambassadors helped the concepts have immediate meaning/application.
- Engagement of students at all levels of the organization was key.
- Using university resources helped to challenge our thinking and strengthen the program.
- Varying approaches (i.e., meetings, new member training, and retreat) helped keep content fresh.

Costs/Resources Needed:

Significant staff time was needed to carry out this initiative. However, no out-of-pocket expenses were incurred.

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Incorporating a Computer-based Training System to Facilitate Psychomotor Skill Assessment in a University Teaching Laboratory

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Incorporating a Computer-based Training System to Facilitate Psychomotor Skill Assessment in a University Teaching Laboratory

Introduction

The use of computer-based training systems (e.g., simulation systems, etc.) has been identified as an effective method of providing psychomotor skill development in a variety of contexts, including welding (Byrd, 2014; Byrd, Stone, Anderson, & Woltjer, 2014; Stone, McLaurin, Zhong, & Watts, 2013), surgery (Cope & Fenton-Lee, 2008), equipment operation training (Bleazard et al., 2018), and safety training (Filigenzi, Orr, & Ruff, 2000). Topics such as welding include a wide range of psychomotor skills that can be developed through repetitive skills application and training (Byrd et al., 2014). Psychomotor skills are described as a link between physical and mental processes that are used to accomplish tasks (Byrd, 2014; Phipps, Osborne, Dyer, & Ball, 2008). Regarding welding, computer-based training systems can be used to help improve one's dexterity and skill to manipulate physical objects (e.g., a molten weld puddle, a welding electrode, etc.) to complete welding activities (Byrd, 2014; Stone et al., 2013).

As an educational technology, a computer-based training system could be implemented in agricultural education settings. In the context of a university-level agricultural mechanics course, educational technologies could help to play a role in welding-related psychomotor skill development and assessment. Further, as computer-based training systems can serve a variety of functions for users (Byrd, 2014; Stone et al., 2013), perhaps the integration of such systems could serve to assess students' welding skill development. Welding skill instruction is frequently an important component of agricultural mechanics instruction (Shultz, Anderson, Shultz, & Paulsen, 2014). Thus, it stands to reason that the incorporation of this type of system (i.e., a Miller® LiveArc™ Welding Performance Management System; hereafter referred to as a LiveArc™ system) could help to fulfill the fundamental task of providing objective, unbiased, critical welding skill assessment in a university-level agricultural mechanics course.

How it Works

Neither a virtual reality (VR) or augmented reality (AR) system, the LiveArc™ system is designed to provide real-time, instantaneous welding skill feedback through an advanced computer system that measures a series of parameters vital to weld quality (e.g., travel speed, travel angle, work angle, arc length/contact-to-work distance (CTWD), voltage, amperage, and aim). These variables are measured with a series of motion-tracking sensors and cameras that are placed in at the top of the machine's computer screen and on the electrode holder and welding gun/stinger. The LiveArc™ system can be used with the shielded metal arc welding (SMAW), gas metal arc welding (GMAW), and flux-cored arc welding (FCAW) processes. The LiveArc™ system is designed to function in a variety of weld positions as well, including the flat, horizontal, and vertical positions, maximizing its flexibility as an educational tool. The LiveArc™ system is shipped pre-programmed with a variety of welding assignments; users can add customized assignments as well, each with programmable tolerances. Further, the LiveArc™ system can be used in either *Simulation Mode* or *Weld Mode*, both of which collect welding skill data and provide numerical score outputs based on performance. Based on the weld variable tolerances set up by the system administrator (i.e., the Agricultural Mechanics Applications

[AgEdS 388] course instructor), the LiveArc™ system can be programmed to provide visual, auditory, or physical feedback when a user exceeds the designated tolerances. The LiveArc™ system computer interface can be used to store and track individuals' welding skill performance data over time (Miller Electric, n.d.).

During the Spring 2018 semester, the AgEdS 388 course instructor, in conjunction with the co-author of this abstract, purchased a LiveArc™ system and began incorporating the LiveArc™ system into the welding portion of the course, which lasts for approximately 10 weeks each semester. The purpose of the acquisition and subsequent inclusion of this educational technology was to provide critical, objective welding-related psychomotor skill development and assessment procedures for students. We wish to note that because delays in implementation occurred due to a variety of factors (e.g., shipping delays, instructor system use training delays, etc.), the LiveArc™ system was not included within the full scope of the 10 weeks of welding skill training offered in the AgEdS 388 course. Rather, the course instructor was able to incorporate the LiveArc™ system into the final weld exercise of the semester, which is a 2F horizontal tee weld performed with the GMAW process. Because this was a custom assignment for this course, the course instructor programmed it into the LiveArc™ system. Students were asked to first use the *Simulation Mode* to perform the test weld. Each student who scored a composite score of at least an 80 was permitted to attempt the same weld in the *Weld Mode*. The composite score achieved during the *Weld Mode* served as the score for the weld exercise.

Implications

The AgEdS 388 course students found the LiveArc™ system to be a beneficial educational tool that can accurately assess their welding skill performance. Perhaps more importantly, the use of a LiveArc™ system removed human subjectivity when evaluating welding skill performance. As educational technologies continue to evolve, adopting and including such items in agricultural education settings will become increasingly paramount for student and instructor success (Smith, Stair, Blackburn, & Easley, 2018).

Future Plans, Advice to Others, & Costs

We anticipate that the LiveArc™ system will become a more permanent welding skill assessment tool within the AgEdS 388 course at Iowa State University (ISU). Additionally, we plan to procure additional funds to purchase more LiveArc™ system units soon, as well as institute an experimental study involving the system. The LiveArc™ system cost $49,430.00 to procure from a university-approved vendor. Two grants from ISU computer technology fee funds and funds from the Department of Agricultural Education and Studies were used to fund the system. Neither a welder nor welding consumables (e.g., wire, electrodes, etc.) were included as part of this total cost. The LiveArc™ system is designed to work with modern Miller Electric welders (Miller Electric, n.d.), so agricultural mechanics laboratories that use older equipment may have to purchase a newer welding system to use in conjunction with the LiveArc™ system. We do suggest that university-level faculty who are interested in procuring a LiveArc™ system work with any available computer technology initiative funds at their respective institutions, as well as with industry stakeholders, to help offset the costs of purchasing a system and any additional welding equipment needed.

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Incorporating a Weld Settings App into a University-level Agricultural Mechanics Course

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Incorporating a Weld Settings App into a University-level Agricultural Mechanics Course

Introduction

As a traditional portion of agricultural mechanics curricula, welding is often included in many school-based agricultural education (SBAE) programs that provide agricultural mechanics instruction to secondary students (Pate, Warnick, & Meyers, 2012; Rose, Pate, Lawver, Warnick, & Dai, 2015; Shultz, Anderson, Shultz, & Anderson, 2014). As such, it is reasonable to expect SBAE teachers to have a certain degree of comfort and competence regarding welding-related knowledge and skills prior to engaging secondary students in the content area (Pate et al., 2012). To develop competence in technical agriculture content, preservice SBAE teachers enroll in coursework designed to engage them in relevant content related to the agricultural industry (Whittington, 2005). Moreover, developing preservice teachers' comfort with technical content (e.g., agricultural mechanics) is assisted through participation in such course experiences (Tummons, Langley, Reed, & Paul, 2017). Preservice teachers are often uncomfortable with agricultural mechanics content (Tummons et al., 2017). Providing new, positive experiences that accommodate and build upon prior knowledge and skills can help to provide smoother transitions into the unknown (Rank & Smalley, 2017).

As part of the process of developing knowledge, skill, and comfort with a technical content area (e.g., agricultural mechanics), using technology in a given setting (e.g., such as within an agricultural mechanics laboratory) can help to develop and reinforce specialized knowledge and skills (Byrd, 2014). Moreover, technology-based applications can be impactful when attempting to alleviate anxieties experienced during skill-based exercises, such as weld process training (Byrd, 2014). Smith, Stair, Blackburn, and Easley (2018) further described advancements in technology for educational purposes (i.e., educational technologies) have resulted in a greater diversity of such technologies being incorporated into SBAE settings in recent years, particularly regarding the use of smartphones and apps. Considering the need for preservice teachers to be competent and comfortable regarding novice-level welding-related knowledge and skills, as well as the flexibility of educational technologies (e.g., smartphones and apps) to help positively impact the teaching and learning experience, it is conceivable an opportunity for useful, practical alignment exists in the context of incorporating the Miller Weld Setting Calculator smartphone app into a university-level agricultural mechanics course.

How it Works

Applied Agricultural Systems Technology (AGED 2203) is a hands-on, skills-based applied agricultural systems course for preservice SBAE teachers at Arkansas Tech University (ATU). The overarching objective of the course is to develop the elementary agricultural mechanics skills preservice teachers will need as they begin their teaching careers. Typically, there is a wide range of experience among the preservice teachers. Some enter the course with an extensive agricultural mechanics background; however, many students have little to no experience in agricultural mechanics subject matter. The Miller Weld Setting Calculator app was used in this course to provide an easily accessible reference for determining machine process settings used in different welding processes.

At the beginning of the welding unit of the course, the preservice teachers were asked to download the Miller Weld Setting Calculator app. The course instructor gave an overview of the app and provided basic instruction about its use. The app includes settings for multiple processes (e.g., Shielded Metal Arc Welding [SMAW], Gas Metal Arc Welding [GMAW], etc.). The app allows the user to select the process, material type, material thickness, and consumable material size and type. This course focused on the SMAW and GMAW processes. If the SMAW process is selected, the app will provide the suggested amperage range, polarity, penetration, position, usage, and an electrode description. Similarly, selecting the GMAW process will result in information on wire size, wire feed speed, shielding gas, voltage range, and amperage range, all of which were based on the material type and material thickness that were entered previously.

Miller® XMT® 350 CC/CV multi-process welders were used in the agricultural mechanics laboratory at ATU. Preservice teachers learned to use both the SMAW and GMAW processes. Preservice teachers were required to use the app to properly adjust their welding machines when they changed processes or material types and/or thicknesses. As a portion of the course's final exam, the instructor purposefully set all the machines to the incorrect settings for amperage/voltage, polarity, and process. The preservice teachers were required to use the app to properly set up their welding machines and complete both a 1G position butt weld and 2F position tee weld with the SMAW process. They were then required to properly change the welding machine settings and perform both a 1G position butt weld and 2F position tee weld using the GMAW process.

Implications

The preservice teachers were able to properly adjust their welders to the suggested settings based on the welding process, material type, and material thickness being used. Anecdotal evidence suggested the preservice teachers were able to develop their welding skills more quickly in comparison to students in past sections of this course that did not use the app. The app allowed the preservice teachers to be more confident they used the correct settings for their process, thereby allowing them to focus their efforts on employing the correct welding technique variables (e.g., work angle, etc.). The Miller Weld Setting Calculator app will, hopefully, be a pragmatic and useful resource for these preservice teachers when they begin teaching. We expect these preservice teachers will be able to use this tool to teach welding machine set-up and use in their future SBAE programming and content.

Future Plans, Advice to Others, & Costs

We plan to use the Miller Weld Setting Calculator app in future sections of this course. Our future plans also include identifying other apps that could be useful in the agricultural mechanics laboratory. Using the Miller Weld Setting Calculator app was, in our experience, a practical and easy-to-implement part of an agricultural mechanics course experience. We do encourage instructors who plan to use this app to allow their students to find the proper welding machine settings themselves rather than simply telling them which settings to use. In addition to using the app, preservice teachers should also be cognizant of how they can use resources, such as this app, in their future teaching practices. The Miller Weld Setting Calculator app is available free of charge and can be readily downloaded to either iOS or Android operating systems.

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Legal Eagles: Cultivating Knowledge about Teacher Liability in School-based Agricultural Education Laboratory Settings

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Legal Eagles: Cultivating Knowledge about Teacher Liability in School-based Agricultural Education Laboratory Settings

Introduction

The inclusion of laboratory settings is a characteristic of the vast majority of school-based agricultural education (SBAE) programs (Shoulders & Myers, 2012). Laboratories have historically included many types of facilities (e.g., agricultural mechanics, greenhouses, etc.) and have long been considered a vital portion of SBAE programs (Twenter & Edwards, 2017). SBAE laboratories are designed to be used as a medium through which to connect classroom content to real-world application (Phipps, Osborne, Dyer, & Ball, 2008). Moreover, laboratory settings provide SBAE teachers opportunities to apply hands-on, minds on teaching strategies to develop students' abilities and skills (Phipps et al., 2008; Talbert, Vaugh, Croom, & Lee, 2014).

Regarding laboratory instruction, many teachers report that laboratory-based content is important to teach (Shultz, Anderson, Shultz, & Paulsen, 2014), potentially indicating that laboratory spaces are well-used in many SBAE programs. SBAE laboratories demand much attention and management to remain viable as learning environments (Saucier, Vincent, & Anderson, 2014). Moreover, teaching in laboratories can present additional liabilities not commonly found in other areas of a school (McKim & Saucier, 2011). These additional liabilities could include burns from welding in an agricultural mechanics laboratory, lacerations from sharp blades when pruning plants in a greenhouse, a crushed foot from working with cattle in a livestock handling facility, and so forth. Thus, teachers should be prepared to address liability concerns related to teaching in SBAE laboratory settings (McKim & Saucier, 2011).

Teacher liability has historically been an issue associated with SBAE, particularly in relation to teaching in laboratory settings (e.g., machinery care and use, etc.). For example, Reneau and Poor (1983) found that teachers often were not aware of many issues related to legal concerns and protection. More recently, Hainline, Burris, Ritz, and Ulmer (2017) identified that, from the perspectives of school district attorneys and superintendents, factors related to SBAE laboratories (e.g., student safety, risk assessment, etc.) are of considerable concern for teacher liability. As modern society has become more litigious in the past decades (Imber & Gayler, 1988), greater emphasis has been recommended on ensuring that teachers are aware of their own liabilities, rights, and legal recourse options (Paul, 2001). Considering that teaching in laboratory settings can present all sorts of hazards that, in turn, provide liabilities for SBAE teachers (McKim & Saucier, 2011; Saucier et al., 2014), perhaps training on the subject (i.e., teacher liabilities and responsibilities) would be useful for teachers at all experience levels.

How it Works

During the Fall 2017 semester, the Methods of Teaching Agricultural Mechanics (AgEdS 488) course instructor at Iowa State University (ISU) developed a variety of written scenarios that related to teacher liability in SBAE laboratories. The course instructor, who is also an author of this abstract, has considerable experience and expertise in educational law as it relates to SBAE and is thus qualified to conduct the activities described in this abstract. The scenarios, each typed on individual sheets of paper, were distributed during a regular course meeting that

focused on teacher liability in SBAE laboratory settings. Ten (N = 10) course students participated and were paired together, creating five pairs of students. One scenario was given to each pair. Each scenario asked students to determine if the scenario's teacher was liable for the issues that resulted within the hypothetical chain of events. Students were also responsible for determining how to minimize potential liability risks presented within each scenario. These scenarios included, but were not limited to, topics related to equipment maintenance, student discipline, student supervision, and so forth, each of which were common issues associated with teaching in SBAE laboratories (McKim & Saucier, 2011). After the students read through their own scenarios and addressed each of the questions, the instructor conducted a thorough, student-led discussion of each scenario. The students read their own scenario aloud and presented their responses. Afterward, the instructor engaged all the course students in the discussion, asking each of them their thoughts on the subject before revealing the actual legal answer and recourse to the scenario. This process was repeated for all five scenarios.

Implications

Throughout the duration of the activity, there was much thought-provoking discussion as it related to each scenario. Anecdotally, the students reported that they were not aware of how the legal system functioned as it related to educational law. They also expressed ignorance about their legal rights, protections, and recourse options that they had as professionals. Additionally, the students reported that the scenarios were realistic and could apply to a wide range of SBAE settings, and that such discussions on teacher liability should be occurring within teacher preparation coursework. These concepts echo the findings of Reneau and Poor (1983), indicating that teachers' awareness of educational law and its applications have remained an issue for teachers, and teacher candidates, in the past decades and to this day. As Saucier et al. (2014) described, teaching in laboratory settings can present numerous challenges. Teachers should be aware of educational law (Hainline et al., 2017; Paul, 2001), particularly in the context of teaching in SBAE laboratory settings.

Future Plans & Advice to Others

Based on the feedback from the students described in this abstract, the AgEdS 488 course instructor plans to continue adapting, and building upon, this activity into future sections of this portion of the course. In addition, the course instructor plans to initiate research and professional development (PD) activities focused on educational law as it applies to SBAE teachers and programs in Iowa. We recommend that teacher preparation program faculty consider integrating similar practices into existing coursework. We do caution that teacher educators should either have expertise in educational law or work closely with an individual who does (e.g., a school board attorney, etc.) throughout the process of implementing this type of activity. Doing so may help to avoid perpetuating myths about teacher liability. We also recommend that those responsible for coordinating PD activities for inservice teachers consider conducting similar activities focused on educational law for the SBAE teachers in their respective states.

Costs

Printing resources, time, and faculty salary served as the principal costs for this activity.

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Looking Back to Move Forward: A Compendium of SAE Literature (1912-2018)

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Introduction: Need for Idea

As humans, we often find ourselves focusing on the present and losing sight of the historical context that can guide us forward. Agricultural Education bears a long and storied tradition of encouraging involvement in Supervised Agricultural Experience (SAE) projects. Despite our traditions, present-day educators may have little research and historical context on which to continue the development of SAE-type programs. The intent of our innovation is to capture, catalogue, and share a database of research to propel the continued development of what we currently call SAEs.

As early as 1825, formalized instruction in agriculture was offered at the university level, and with the passage of the 1862 Morrill Land Grant Act, universities began to experience the beginning stages of formalized agriculture education (True, 1929). By 1912, efforts built a case around the *project method* of teaching in agriculture (Stimson, 1912). The Smith-Hughes Act of 1917 furthered the *project method* implemented at the Smith Agricultural School by providing federal aid for the implementation of vocational education at the secondary level (True, 1929). While starting as the *project method*, throughout the years we have adopted different terminology. In this innovation, we will utilize the term "experiential component" (EC) as a reference to synthesize the many descriptors for the SAE-type component of agricultural education.

Despite a long tradition of experience in agriculture and agricultural education, the tenets regarding SAE come from a variety of perspectives. EC research themes have cycled from planning, garnering and sustaining student investment, record keeping, factors inhibiting participation, motivation, and skill attainment with each evolution of the EC (i.e. Supervised Farm/Home Project, Supervised Occupational Experience, and Supervised Agricultural Experience). Decades of recurring themes have yielded recommendations relative to individual refrains, but these recommendations do not often present in terms of the multiple facets of the EC. The cyclical nature of literature trends indicates the need to work toward a unified venture to support the holistic benefit of present day SAE research and practice. This innovation captures a vast body of literature, providing the scope and timeline for the EC from inception to current day to allow agricultural education to make concerted efforts toward a unified voice regarding the EC.

Methodology: How it Works

This innovation frames the current and historical trends in the EC research through the compilation of journal and research trends. Historical context advances through the assembling of over 700 publications related to supervision, experience, experiential learning, and farming within agricultural education. The original innovation started with approximately 80 titles related to the experiential component of agricultural education, compiled from a Boolean search for "Supervised Agricultural Experience." Additional searches cross-referenced reference sections from the original 80 papers until we reached near saturation. Further search criteria included "Supervised Farm Practice," "Supervised Occupational Experience," "Supervised Agricultural Experience," "Experiential Learning," "Agricultural Education Proficiency," and "Agricultural Education Degree." Publications range from Acts of Congress to bulletins, periodicals (namely, The Ag Ed Magazine), journal articles, theses, and dissertations. Specific journal searches included the Journal of Agricultural Education (formerly the Journal for the Association of Agricultural Educators) and the Journal of Experiential Learning. Compilation of

literature trends derived through key ideas conveyed solely in titles, providing a limitation of the innovation, as titles do not always convey the full purpose and substance of the publication. However, this approach offered the most representative review to begin identifying the trends in research and key researchers who have contributed to the theoretical and conceptual development of the EC over the last 100 years. This innovation aligns with AAAE Research Priority 4, Question 3: "How can delivery of educational programs in agriculture continually evolve to meet the needs and interests of students?" (Roberts, Harder, & Brashears, 2016).

Results to Date: Implications

Thus far, over 700 publications (1912-2018) have been cataloged, hyperlinked and sorted by year, author, title, states represented, phase of EC (Supervised Farm Project, Supervised Occupational Experience, and Supervised Agricultural Experience), decade, and publication type, as well as keyword (record keeping, supervision, enrollment trends, student/teacher/stakeholder perceptions, benefits, assessment, etc.). The compendium currently exists in the form of a shareable and indexed Google Sheet.

The further development and dissemination of the Compendium of SAE Literature holds two primary implications for the profession. First, the catalog provides a database of research regarding trends in the EC. Second, it provides a common site for voices and facets to come together congruently regarding the history, but more importantly, further development of Supervised Agricultural Experiences. Currently, one of the challenges facing SAE is the variety of facets from which it is researched. With this in mind, our innovation is a step towards forming a more unified venture surrounding SAE and its future in school based agricultural education.

Future Plans: Advice to Others

As additional publications become available, they will continue to be added to the compendium. This reference source will provide greater depth in review and perspective for researchers with lines of inquiry around experiential learning and the EC. By offering a common, summarized, and single research base, the field will be better equipped to identify gaps and opportunities in addition to formulating a cohesive line of inquiry for SAE research and practice. For the benefit of agricultural education, this resource should be available for researchers and practitioners across the profession, but especially to scholars with foci around experiential learning and the EC.

Costs: Resources Needed

While this resource cost time to produce, no additional input costs were necessary. As we move forward, we are seeking collaborators to enhance the depth and breadth of identified SAE research. If a more comprehensive compendium is to be developed, summaries from original authors (as available) would enhance the database, allowing our profession to move toward a more complete and informed perspective on the historical development and future possibilities of Supervised Agricultural Experiences.

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Making the Most Out of a Study Abroad Pre-Departure Class

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Making the Most Out of a Study Abroad Pre-Departure Class

Introduction/Need for Innovation

Students need to participate in study abroad experiences to help them develop a personal understanding of another culture (Swinger, 1985) and increase their global competencies (Zhai and Scheer, 2002). In 2017, only 15.5% of bachelor's degree students in the United States study abroad before graduation (IIE, 2017). While there was an increase of 3.4% in 2016-2017 over previous years (IIE, 2017), there is still a large percent of students who are not taking advantage of study abroad opportunities. In an effort to increase the number of students able and willing to travel internationally, many universities are increasing the number of short-term, faculty-led experiences (Hulstrand, 2006). Almost two-thirds (63%) of all study abroad experiences U.S. institutions of higher education offer are less than eight weeks in length (IIE, 2017). Included in this group of experiences are "faculty-led" in which the lead instructor travels with the group the entire time in country.

To improve students' intercultural awareness, faculty members should support pre-departure work (Holmes, Bavieri & Ganassin, 2013) to better prepare students for their time abroad. "Students' pre-departure expectations and attitudes toward a specific culture or people may significantly influence outcomes" (Dekaney, 2007, p. 19). Pre-departure class sessions help students prepare and take full advantage of a short-term, faculty-led study abroad experience (Dekaney, 2007; Goldstein & Kim, 2006).

How it Works/Methods/Steps

Students were recruited during the fall 2017 semester for a study abroad experience to the Czech Republic. Once the spring 2018 semester began, the course met nine times prior to departure. Four of the 11 students were not on campus during the spring semester and had to participate via distance delivery. Sessions were shared and recorded using Zoom. The class consisted of typical pre-departure assignments including presentations, fact sheets on specific topics, and writing questions to send to hosts before we arrived. Each class session consisted of a short language practice, dealing with pre-departure paperwork, student presentations, and cultural topics.

To adequately prepare students to fully appreciate and participate in an international experience, several components of the pre-departure course were emphasized. One of them was facilitating a discussion board for "burning questions" about the experience for the instructor to answer and allow all students to benefit from the response. Another was sharing YouTube videos from Czech natives about visiting the country. In an effort to increase the language proficiency, minimize concerns about language barriers, and prepare students to be a 'traveler' rather than a 'tourist', the Mango Languages app was required (Mango, 2018).

In addition to the coursework, a major supplemental pre-departure activity was held to help students prepare for their time in country. Students from the Czech Republic who were currently studying at Kansas State University were invited to a meal to meet students in my class. I coordinated the event with assistance from the KSU Education Abroad office. My students were asked to contribute a dessert and attend to converse with the Czech students who were on campus that semester.

Results to Date/Implications

During the spring 2018 semester, students in the course presented 18 different topics, learned photography and blog writing skills, contributed to discussion posts, and wrote questions for their in-country hosts. These activities helped them get to know each other prior to leaving the U.S. for the 11-day adventure.

While all students were encouraged to attend the Czech Student Gathering, only five were able to make it to the meal. We did have 11 Czech students attend to share tips, advice, and places to visit while we are in the country. Students in the class shared what they learned with their classmates during the next scheduled class session. The following comments illustrate what the domestic students gained from the experience:

- *I truly enjoyed meeting with the Czech students before going to visit their country. It was a great opportunity to learn about their favorite things in the country and things we shouldn't miss while we are there. It was a great way to get a taste of what we would be experiencing.*
- *Everyone, not just the study abroad students, learned a lot and got a small taste for what we would be experiencing on our trip.*
- *By including this activity, my expectations and preconceived ideas about the Czech Republic were changed.*

The Mango app was used by students to learn basic conversational Czech, but no one made it through the entire module. One student commented:

- *I did love using Mango to learn some Czech before departing. I was then able to use them in country. It felt really good to be able to communicate with locals. I wish I would have learned even more.*

Overall, the time and energy spent on pre-departure activities is crucial for helping the short-term study abroad be successful and impactful for each student. One student said, "*This is my third study abroad trip, and this trip I have felt the most prepared for and learned the most.*"

Future Plans/Advice to Others

I learned a great deal from leading my first study abroad and ways to better prepare the students prior to departure. One recommendation is to work with the study abroad office to identify on-campus international students from the country/area you will be visiting and organize a social gathering. My students benefited from the opportunity to converse with students from the Czech Republic and wanted to set up another meal closer to the departure date. I also learned to require completion of a certain number of modules in the Mango app to achieve a higher degree of language proficiency. Students started out strong, but did not get as far as I would have liked in their language practice. The work put into the pre-departure course helped students prepare for the experience and enjoy their time in country to a deeper level.

Costs/Resources Needed

The cost of the meal for the student gathering was minimal ($120). Students provided the desserts and I contributed a few side dishes. Tuition funds for the study abroad course paid for the event. Mango Languages is offered free from the university library. If you cannot find it for free, it can be purchased for $19.99 per month. Technology and the learning management system were already in place to include the distance students in the pre-departure activities.

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Qualtrics Equips Teachers in Curriculum Quagmire

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Qualtrics Equips Teachers in Curriculum Quagmire

Introduction & Need for Innovation

Curriculum planning is essential to the success of any school-based agricultural education (SBAE) program (Lunenburg, 2011; Talbert, Vaughn, Croom, & Lee, 2007). In fact, research suggests effective curriculum planning is related to increased efficiency and productivity within a classroom (Oliva, 2009). Within Michigan, curriculum planning takes on additional importance as it is connected to SBAE program funding (M. Forbush, personal communication, May 2017). Michigan agriculture, food, and natural resources (AFNR) education standards are concatenated into twelve *segments*, ranging from *Animal Anatomy and Physiology* to *Career Readiness and Leadership*. As students matriculate through courses in Michigan SBAE programs, they transition from program participants (passing coursework containing less than seven segments) to program concentrators (passing coursework containing between seven and 11 segments) to program completers (passing coursework containing all 12 segments). As students move up each level, the amount of program funding increases. Therefore, programs have been encouraged to develop first-year courses containing seven segments and second-year courses containing the remaining five segments (M. Forbush, personal communication, May 2017). Given the complexity of curriculum planning (Lunenburg, 2011), however, some Michigan SBAE teachers have struggled to effectively plan their curriculum, leading to individual program funding cuts of up to $50,000 (M. Forbush, personal communication, May 2017).

The importance of curriculum planning in Michigan, and across the nation, is also apparent in the need for SBAE teachers planning learning experiences which illuminate core academic areas, such as science (McKim, Velez, Lambert, & Balschweid, 2017; Wilson & Curry Jr., 2011). A number of barriers to illuminating science within SBAE, including time to plan curriculum, have been identified (Warnick & Thompson, 2007). To address these barriers, SBAE leaders must think innovatively about methods to empower teachers to strengthen the science learning opportunities available throughout secondary school AFNR education curriculum.

Methods & How it Works

The Michigan AFNR Curriculum Planning Tool was originally developed by Michigan State University faculty in association with the Michigan Department of Education in 2016. Developed using Qualtrics, the first version included a step-by-step process for selecting segments and associated standards for a single course, including recommendations for a seven-segment first year course and five-segment second year course. As participants used the tool, segment and standard selections were recorded and a course report (i.e., course name, instructor name, segments and standards covered) was made available to users. Version one of the curriculum planning tool was presented to SBAE teachers in November 2016 at an annual professional development conference.

After version one, developers discovered an opportunity to enhance the curriculum planning tool by linking AFNR standards selected to the next generation science standards (NGSS). To link Michigan AFNR standards to NGSS, a group of 15 Michigan SBAE teachers convened in July 2017 to (a) align each Michigan AFNR standard to relevant NGSS and (b) describe a learning experience which would combine AFNR standards and NGSS. The work completed by teachers was built into the curriculum planning tool by including associated NGSS

and example learning experiences within the course report. Additionally, the developers added a function for the course report to be emailed to participants, allowing for easier storage. Version two of the tool was presented to early career Michigan SBAE teachers in July 2017 and all Michigan SBAE teachers in November 2017 at established professional developments.

Results to Date & Implications

Using Qualtrics allows developers to collect usage data. As of July 2018, the curriculum planning tool had been used 313 times since its inception. In Michigan, there have been an average of 115 SBAE teachers between 2016 and 2018. Importantly, the curriculum planning tool is designed to be used multiple times by a single teacher, with each use associated with a different course. Qualitative feedback retrieved from participants in professional development sessions include, “I love the segment tool…it is even better now that it gives lesson ideas with the standards that are selected,” and “makes understanding the segments and how learning objectives could be aligned with those objectives so much easier.”

The curriculum planning tool empowers teachers to align program-level needs with state funding-related requirements, significantly improving the funding of Michigan SBAE programs (M. Forbush, personal communication, May 2017). The curriculum planning tool also empowers teachers to see opportunities for incorporating NGSS within their curriculum. In a professional development session, one teacher expressed the value of connections between Michigan AFNR curriculum and NGSS when he shared, “the segment and planning tool is a great organizational tool and having the NGSS in there is extremely useful.” In addition, teachers have reported utilizing the course reports, with NGSS linkages, to leverage AFNR courses for science credit.

Future Plans & Advice to Others

Having proven to be a valuable resource for Michigan SBAE teachers, developers plan to present the Michigan AFNR Curriculum Planning Tool to new and early-career teachers in Michigan at an established professional development session to help beginning teachers alleviate funding concerns associated with curriculum planning. While the Michigan AFNR Curriculum Planning Tool is specifically designed around the unique structure of program funding, segments, and standards in Michigan, other states may have similar systems linking standards-coverage with funding. Additionally, teachers may demonstrate other needs, such as strengthening the connections between AFNR and core content areas. SBAE leaders within those states are, therefore, encouraged to explore the features of Qualtrics, or other online tools, in an effort to develop needs-based resources. Existing mindsets may suggest this is the role of the teacher; however, off-loading this responsibility can have significant impacts on the quality of AFNR education being offered and the relationship between SBAE leaders and teachers.

Costs

The primary cost associated with this innovation is the time spent by faculty and SBAE teachers to develop the tool. In total, faculty members have spent approximately 20 hours developing the tool. Additionally, 15 SBAE teachers contributed three hours of their time linking Michigan AFNR standards and NGSS, which Michigan Department of Education provided $2,000 to fund. Dissemination of the curriculum planning tool has been without direct cost, as Qualtrics software is funded through MSU and presentations have occurred at established professional development sessions.

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Raising Mosquitofish in SBAE to Combat Mosquito-borne Disease in Local Communities

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Introduction

School-based Agricultural Education (SBAE) programs can offer unique and relevant learning experiences to students through community partnerships and engagement (Hastings, Barrett, Barbuto, & Bell, 2011). Learning experiences that challenge students to think critically and offer solutions to complex issues in local environments provide many benefits to both students and community members (Ernst & Monroe, 2006; Powers 2004). In central Florida, mosquito-borne diseases such as West Nile virus, Eastern equine encephalitis, and St. Louis encephalitis cause concern (University of Florida Extension, 2009). Agencies across Florida have worked to eradicate mosquito-borne diseases by controlling for mosquitos through cultural, biological, and mechanical methods. Public education on mosquito control has also been identified as a solution to increased community awareness and acceptance of control methods. The Roosevelt Academy of Leadership and Applied Technology agriculture program in Polk County, FL bridges STEM education and community involvement through a partnership with the Polk County Division of Mosquito Control. The SBAE program raises *Gambusia affinis*, commonly known as Mosquitofish or Gambezi, to distribute to community members as a biological control for mosquito larvae residing in ornamental fish ponds.

How it Works

The Roosevelt Academy SBAE program has a long history of teaching fish production as an academic subject. The program, led by agriculture teachers Ray Cruze and Tim Bean, includes students in grades six through 12. The public school is designed for both exceptional student education (ESE) students and non-ESE students that desire a smaller learning environment. The aquaculture program includes a greenhouse with four 1,000-gallon tanks and concentrates on raising Tilapia for food and as a nutrient source for growing hydroponic vegetables on their school farm. The idea for raising Gambezi was sparked through discussion with the county's division for mosquito control which raises the fish as a biological control for mosquitos, a common approach to eradicate mosquito larvae in freshwater aquariums and small outdoor ponds in the southern half of the United States.

Gambezi are extremely easy to breed and are prolific breeders. In fact, they are the only North American fish classified as a livebearer, and are similar to the common guppy. Gambezi are small in comparison to many freshwater fish. Adult females reach a length of 2.8 inches while males are smaller, reaching a length of 1.6 inches. The smaller fish can be raised in any version of aquaculture tank, but tanks require modified filters so the fish can't swim through them. The Roosevelt Academy SBAE program uses a simple, 500-gallon tank to raise Gambezi within their greenhouse. The 500-gallon tank will hold 3,000 fish. Because Gambezi are cannibalistic and will feed on their own fry, an artificial structure must be placed in the tank as habitat, offering protection for young fry. A standard fish pellet mix can be used as the food source. The fish will reach maturity in roughly two months and will begin reproducing at that time. Each female will give birth to around a dozen fry three to four times per year.

Results/Implications

The Roosevelt Academy SBAE program is in the early stages of raising Gambezi. To date, they have raised 2,000 Gambezi and are in the process of raising 3,000 more. The partnership with the Polk County Division of Mosquito Control will assist with public awareness of the program. The fish will be given freely to members of the community who seek the fish for biological control in their ornamental ponds. The quick-breeding fish offers a sustainable and regenerating population that will allow the operation to be economically efficient. The waste from the fish is used as a nutrient source for many types of vegetables grown on the school farm.

Besides offering a community service, this project yields great impact on student learning outcomes. Students are exposed to a curriculum that explores characteristics of the fish and production of the fish. Furthermore, STEM is integrated into components of the curriculum, challenging students to identify problems and provide solutions to the production system. In a broader topic, students learn how biological controls can be used in Integrated Pest Management plans, as identified by the local county's mosquito control plan.

Future Plans

The agriculture instructors at Roosevelt Academy are excited about sharing this program to SBAE programs in Polk County and beyond. According to Ray Cruze, this type of aquaculture system is inexpensive, readily available, and provides unique learning experiences to students while meeting a community need. The instructors are eager to meet with agriculture teachers from across the county and to offer guidance on establishing Gambezi breeding tanks. A networking and support system could be created by teachers utilizing this project within their classrooms or FFA programs. Furthermore, for schools that do not have SBAE programs, this project could be utilized in science and environmental education curricula.

The Roosevelt SBAE is also investigating ways to conduct social marketing that raises community awareness on mosquito-borne diseases and the use of control methods to combat changing mosquito populations. Future plans could be setting up an informational stand at local events or reaching out to media about the program.

Costs/Resources Needed

The total cost of the Gambezi aquaculture system was $1,900. The system includes a 500-gallon tank, heater, thermostat, filter, and aerator. The Gambezi fry were provided free of charge by the local mosquito control district. Fish food is relatively inexpensive and a 5 lb. bag of 3/16" floating pellets can be purchased for less than $15. It is important to note that this system, although basic compared to larger aquaculture systems, is still designed for large-scale production of Gambezi. Much smaller versions, even small fish aquariums, can be used as a demonstration tool for teaching about biological controls. Partnering with local agencies, such as a local division for mosquito control, provide an important resource for raising Gambezi. Local and state laws and permit requirements must be investigated before attempting to raise and distribute Gambezi. In some states, special permitting must be obtained before raising any fish through aquaculture and in some locations it may be unlawful to release Gambezi as a biological control.

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Shop ‘til You Drop: Emphasizing Introductory Laboratory Management Skills Through a Field Trip Experience

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Shop 'til You Drop: Emphasizing Introductory Laboratory Management Skills Through a Field Trip Experience

Introduction

Competence in various aspects of technical content areas, such as agricultural mechanics, is typically an expectation of school-based agricultural education (SBAE) teachers (Whittington, 2005). Moreover, competence in various areas of technical agricultural mechanics content (e.g., laboratory management, woodworking, welding, etc.) is often described as paramount for SBAE teachers (Burris, Robinson, & Terry, 2005; Saucier, Vincent, & Anderson, 2014). As a hands-on, engaging portion of the SBAE curriculum that is often popular with secondary students, a wide variety of technical agricultural mechanics knowledge and skill areas are regarded as important to teach (Shultz, Anderson, Shultz, & Paulsen, 2014). Such a wide range of topical areas can create a myriad of issues, including meeting tool and equipment needs (McCubbins, Anderson, Paulsen, & Wells, 2016; McCubbins, Wells, Anderson, & Paulsen, 2017), ensuring the availability of adequate work space (Phipps, Osborne, Dyer, & Ball, 2008; Saucier et al., 2014), and maintaining student safety as the top priority (Saucier et al., 2014). Thus, it is imperative that SBAE teachers be adequately prepared to thoroughly engage in the teaching and learning process and provide high-quality agricultural mechanics instruction (Shultz et al., 2014; Wells, Perry, Anderson, Shultz, & Paulsen, 2013).

As a portion of the teaching and learning process, prior preparation and laboratory management are essential to ensuring that agricultural mechanics instruction is of suitable and desirable quality (Saucier et al., 2014). Proper laboratory management skills (e.g., budgeting, ordering and stocking consumable materials, etc.) help to ensure that the learning environment is ready for students and that work (e.g., skill development exercises, student projects, etc.) can be completed in an efficient and effective manner (Saucier et al., 2014). As laboratory management skills are varied and may take considerable time for SBAE teachers to learn (Saucier et al., 2014), this process should, conceivably, begin during the teacher preparation phase of teachers' careers. Perhaps the use of a live exercise in selected laboratory management skills could serve to assist in developing this skill and knowledge base.

How it Works

During the Spring 2018 semester, the Methods of Teaching Agricultural Mechanics (AgEdS 488) course at Iowa State University (ISU) was delivered to 19 students. The course was focused on developing the technical agricultural mechanics, laboratory management, and pedagogical knowledge and skills of the students. As part of the course requirements as a teacher education course, the students were each required to deliver a 50-minute lesson to their peers that focused on a topic commonly taught in agricultural mechanics coursework at the secondary level (e.g., using a table saw, etc.). In addition to lesson objectives, an interest approach, and so forth, each lesson plan was mandated to have an operational theory related to the lesson's topic, a hands-on skill demonstration and evaluation component, a designated amount of time to practice the skill activity, at least five minutes of facility and equipment clean-up and care, and the materials and items needed to implement the lesson topic.

At least two weeks in advance of the first lesson to be taught, the AgEdS 488 course instructor allocated a two-hour in-class time block for the students to plan out the details of their individual lessons. This session provided the opportunity for the students to consult with each other, the course instructor, and the course teaching assistant to determine suitable approaches for their lesson as well as determine which specific consumable materials (e.g., lumber, pipe, electrical wire, etc.) would be needed. Each student was required to submit a list of consumable materials needed for his/her lesson. Both the course instructor and the course teaching assistant checked each list for accuracy. Additional adjustments were made as necessary.

During the following course meeting, the course instructor presented each student with a revised list of the consumable materials needed for his/her lesson as well as a budget cap for the lesson. The students were then informed that the next day's course meeting would take place at a local big-box hardware store. This visit to the hardware store was designed to serve two purposes: 1) to procure the consumable materials necessary for each lesson; and 2) to provide students with the opportunity to gain practical experience in locating, pricing, and allocating consumable materials from a retailer for an entire class of students. After all the students arrived at the hardware store, the entire class was first taken on a walking tour around the store to help familiarize them with the store's layout. Along the way, the course instructor and course teaching assistant provided additional explanations about specialized topics (e.g., power tools, lumber types, etc.) and answered questions. After the walking tour concluded, the students were divided into smaller groups of two or three and given one hour to price and procure all materials required for their lessons. After the one-hour timeframe had passed, the students met at the sales counter to count their materials. Several students had to return excess, exchange incorrect, or procure additional materials for their lessons. Afterward, the individual orders were combined into one large order and purchased with the course instructor's university purchasing card. The students, course instructor, and course teaching assistant then loaded the materials and finished the remainder of the course meeting at the usual course location.

Implications, Future Plans, & Advice to Others

A brief discussion about the hardware store visit was initiated upon its conclusion. The course instructor shared that the ultimate purpose of the exercise was to simulate the experience of procuring materials for an unfamiliar content area, thereby providing experience in an introductory laboratory management skill area (e.g., budgeting, procuring consumable materials, etc.). Most of the students remarked that they had never been inside a hardware store to purchase materials for themselves before, with some noting that they had never stepped into a hardware store before at all. They communicated that this approach was very useful and provided insight into a useful skill set practiced by SBAE teachers daily. We plan to continue using this teaching strategy and recommend that other agricultural teacher preparation programs consider doing the same within their coursework.

Costs

Besides fuel costs for traveling to the local hardware store, there were no atypical costs associated with implementing this teaching strategy in the AgEdS 488 course. The costs of the consumables were covered by the $250.00 course fee paid by each student.

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TASKed with Recruiting Agriculture Teachers

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TASKed with Recruiting Agriculture Teachers

Introduction/Need for Innovation

In 2014, the National Teach Ag Campaign established the State Teach Ag Results (STAR) Program. The intent of this program is to recruit and retain high school agriculture teachers at the state level (NAAE, 2018). The need for new teachers lies in the continuation of a nationwide shortage of agriculture teachers, as outlined by Smith, Lawver, and Foster (2018). Kansas was among the first cohort of 14 STAR States. The program has added additional states each year with 36 currently in the program. According to the campaign's website, "STAR states receive in-kind design and consultation services, access to Teach Ag grant funds, priority preference for Teach Ag Ambassador positions, promotion and assessment summaries" (NAAE, 2018, para 1).

Each STAR state can devise their own ways of disseminating grant dollars to recruit and retain agriculture teachers. The bulk of grant funding and resources from the STAR Program in Kansas go to the TASK Force. The TASK Force, which is an acronym for *Teach Ag Students of Kansas* is a group that primarily focuses on recruiting high school and community college students to a career as an agricultural educator.

How it Works/Methods/Steps

TASK Force is comprised of eight undergraduate students majoring in Agricultural Education and advised by a Kansas State University agricultural education faculty member. Students apply to be a member of the group in April each year and complete an interview process in May. Applicants can be enrolled at one of the two agricultural education degree-granting institutions in the state or a community college, if they intend to transfer to one of these institutions.

The team is selected directly after the interview process and begin their year of service with a meeting at the end of the spring semester. At this meeting, the general itinerary and responsibilities for the upcoming year are discussed. Seven team members serve as liaisons to one of the seven FFA districts in Kansas, while one is usually a second-year member who serves in an at-large position. The team then meets again at the beginning of the fall semester to begin preparing for the four major events hosted each year. At each of these events, the group has three primary goals; recruit future high school agriculture teachers, persuade students to pursue a career in agriculture, and recruit students to the academic institutions the team members represent.

The first event is a workshop for each of the seven Greenhand FFA Conferences. This workshop is designed to expose younger students to careers in agriculture while emphasizing a career as an agriculture teacher. The second event is the Teach Ag VIP Day. This event is held each winter and invites all students interested in becoming an agricultural educator to the KSU campus for an entire day's worth of activities and information on the agricultural education profession. The third activity is awarding a $500 scholarship to one student, from each of the state's seven FFA districts, who intends to major in Agricultural Education at any institution they choose. The scholarship application is administered and evaluated through the National FFA Organization's scholarship program. The scholarships are presented every spring by a TASK Force member at each of the seven district banquets. Our final event of the year is a Tagged to Teach Ag event held during the state FFA CDEs in which students learn more about KSU, college, and the degree while socializing and enjoying ice cream and cookies.

TASK Force members are also engaged in a number of other activities throughout the year to promote the agricultural education profession. Members run booths at numerous conferences, facilitate workshops, and hold Teach Ag Day celebrations each September. Some of these events require the students to travel using their personal vehicle. The TASK Force has funding set aside to reimburse students for mileage at the rate established by the state.

Results to Date/Implications

Kansas has experienced success with the TASK Force model. This is evidenced by an increase of students majoring in Agricultural Education throughout the state and the number of high school agriculture programs that have been started since the model was put into place. In 2014, the year Kansas joined the STAR Program initiative, there were 68 students enrolled in the Agricultural Education major at Kansas State University. Each year it has increased with 72 in 2015, 76 in 2016, 81 in 2017 and 91 students enrolled for the Fall 2018 semester. This increase can, at least partially, be attributed to the efforts of the TASK Force. In addition, there were 163 high school agricultural education programs in the state a year before the STAR Program began, during the 2012-2013 school year (National FFA Organization, 2015). The state now has 198 active programs for the 2018-2019 school year.

The total number of students impacted by the TASK Force each year is hard to estimate, but it has increased each year. For example, during the 2017 Teach Ag event during the Kansas FFA State CDEs, we had approximately 150 students pass through the stations. In 2018 that number rose to 300 students. We have hosted three Teach Ag VIP Days. We started in the fall 2015 with 17 students/guests and has increased each year with 28 students and 12 guests in spring 2017 and 39 students/parents/teachers in 2018.

Future Plans/Advice to Others

The TASK Force could improve in some areas. Something TASK Force does not focus on, outlined as a need from the STAR Program Campaign, is the retention of current teachers. If the TASK Force places more emphasis on teacher retention it may reduce the number of teachers leaving the classroom. Another challenge faced by the TASK Force is student scheduling. It was hard to find meeting times throughout the year and some struggled to travel to their respective districts. Having an at-large position helped to combat this challenge by stepping in to attend events. The TASK Force has been a successful model for Kansas. We are interested in comparing our results to those of other states to continue to improve our programs. We will eventually examine whether this program was effective at recruiting students who graduate in agricultural education and enter the teaching profession. The continuation of this program will ensure Kansas is helping to reduce the agriculture teacher shortage.

Costs/Resources Needed

The funding for the TASK Force events and activities is provided by the National Teach Ag Campaign. For the 2017-2018 school year, costs included the State Convention Booth ($150), travel to district banquet ($900) and Greenhand Conferences ($770), shirts ($250) and the seven scholarships ($3,500). The Teach Ag VIP day cost $2,232 for the winter 2018 event including lunch, promotional items, parking passes, and snacks. The 2018 Tagged to Teach Ag Event cost $807 including snacks, promotional items, and other supplies. An additional $675 is spent on promotional items to be used throughout the year. We spent just under $9,300 on events throughout this past school year.

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Using an Educational Graphic Novel Series to Supplement a Project-based, Food and Nutritional Safety Secondary School Curriculum

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Using an Educational Graphic Novel Series to Supplement a Project-based, Food and Nutritional Safety Secondary School Curriculum

Introduction

The Food and Nutrition Science (FNS) curriculum was created in conjunction with the Shiga Toxin-producing *E. coli* Coordinated Agricultural Project (STEC CAP) grant. As the goal of the STEC CAP grant was to decrease the occurrence of foodborne illness resulting from Shiga toxin-producing *Escherichia coli*, the education and outreach component of the project used research done at higher education institutions to create project-based curriculum for secondary education students to learn about food and nutritional sciences. In an effort to increase public education, researchers developed a four-course curriculum intended for secondary education classrooms. Additionally, seeking to expand the reach of the curriculum and the impact it has on students' knowledge of food safety and science of *E. coli*, a three-part graphic novel series, entitled *Megaburgerz and the E. coli Outlaws,* was developed to enrich the FNS curriculum.

Graphic novels were chosen because they offer a variety of educational benefits. Capitalizing on storytelling and imagery, graphic novels are a multimodal way to introduce readers to new content (Boerman-Cornell, 2017; Schwarz, 2006), effectively sparking readers' interest which can be used to deepen disciplinary understanding (Boerman-Cornell, 2017; Schwarz, 2006; Short & Reeves, 2009). Additional benefits of graphic novels, suggested by Boerman-Cornell (2017) are as follows:

- Reinforce comprehension
- Present new content in a different format
- Illustrate difficult or abstract concepts
- Encourage close reading of text
- Foster critical thinking
- Negotiate multiple perspectives of thinking and practice (p. 40)

The goal of the FNS graphic novel series was to capitalize on the previously discussed educational benefits by bringing awareness of food safety and the dangers of foodborne illnesses, specifically *E. coli*, to high school-aged students. Using characters and short stories to translate challenging scientific material into understandable and relatable concepts, the graphic novel series serves as an accompaniment to the curriculum, providing teachers with both informative reading materials for students and an intriguing way to build interest among students. The idea was generated after reviewing other informative graphic novel series produced through the University of Nebraska, such as *World of Viruses* (University of Nebraska Press, 2015).

Methods

The development process for the graphic novel series included gathering all scientific materials and ideas for relatable short story lesson plans. The next phase was to identify a graphic firm with the ability to write and illustrate the curriculum needs. Many firms were considered, but a graphic novel business with science-based, graphic novel experience was chosen in order to accurately relate underlying scientific principles to the story arc.

Once a firm was chosen, the curriculum and story writing processes began. To aid writers, scientific resources related to *E. coli* and food safety were compiled and submitted to the firm. Following writer familiarization to *E. coli*, the process proceeded with story development and revision, illustration, coloring, and finally, lettering. At each stage of the graphic novel development, the story, pictures, and lettering were all reviewed and factually verified by scientists involved with the STEC CAP grant and teacher-educators involved with the FNS curriculum development and testing.

Results and Conclusions

The three-part graphic novel series *Megaburgerz and the E. coli Outlaws* was completed in Fall of 2017. The graphic novel series includes 60 pages of content with a story detailing the experiences of two teenagers beginning work at a fast-food restaurant. Through the two teenagers' experiences, the reader is introduced to *E. coli* and the importance of simple food safety procedures, such as Clean, Separate, Cook, and Chill (USDA). The graphic novel series is a free resource and is available for download from the FNS curriculum webpage.

Significance

This project meets one of the STEC CAP grant project's overall goals of creating a curriculum for educating the public and students on the dangers of foodborne illnesses. Additionally, it engages high school students in understanding scientific terms and lessons by allowing them to read creative and engaging short stories. By providing multimodal enrichment of food safety and foodborne illness curriculum, the series helps students understand the key points in preventing illness and allows them to use this knowledge in their own lives just by following along with the characters in the novels.

Advice to Others

If seeking to create a graphic novel series, several steps can be taken to ensure timely, quality production. First, gather resources relating to the main idea of the proposed graphic novel. Graphic novel firms may not be familiar with the chosen concept, but easy-to-find resources enable the story developer to become acquainted quickly. Second, research the firms available for such production and seek guidance from places with experience creating these materials helps, such as the University of Nebraska Press (UNP, 2015). Third, designate one person to take the lead and coordinate with the graphic novel firm to allow for more efficient review and editing of content and overall project communications.

Costs

The 60 page *Megaburgerz* series cost approximately $30,000.

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Using GradeCam Go! to Assess FFA Career Development Event Activities

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Using GradeCam Go! to Assess FFA Career Development Event Activities

Introduction

New and emerging technologies have important implications for school-based agricultural education (SBAE) settings (Doerfert, 2011). Declining costs over time and improving ease of access to such technologies, including specialized apps, smartphones, digital multimedia, and so forth, have somewhat helped to increase their adoption into SBAE settings (Smith, Stair, Blackburn, & Easley, 2018). Further, the use of technology in the context of SBAE can be used to promote educational goals and outcomes and to provide for useful knowledge and skill development (Bunch, Robinson, & Edwards, 2015; Bunch, Robinson, Edwards, & Antonenko, 2014; Bunch, Robinson, Edwards, & Antonenko, 2016). Many SBAE teachers report that they are receptive to using technology applications in their programs, often with the support of local school administrators (Smith et al., 2018). While the costs of new technologies and implementation into the curriculum remain chief barriers to adoption and usage in SBAE (Coley, Warner, Stair, Flowers, & Croom, 2015), perhaps lower-cost and flexible technologies could have utility in SBAE settings in various ways (e.g., student assessment, etc.).

Technology applications have, throughout recent decades, been used in the realm of student assessment (Fisteus, Pardo, & García, 2013). In the context of SBAE, formative and summative student assessment can be constituted in many ways, such as through live skill demonstrations, written examinations, participation in FFA Career Development Event (CDE) activities, and so forth (Phipps, Osborne, Dyer, & Ball, 2008). Moreover, with the complexities associated with delivering quality student assessment (Fisteus et al., 2013; Phipps et al., 2008), quality technology platforms that are easy and quick to use, efficient, effective, and appropriate for a given situation could remain as a solid and reliable student assessment technique in SBAE settings. Kilickaya (2017) described how assessment in a classroom setting may be improved via an instantaneous student feedback and assessment tool called GradeCam Go!. It is conceivable that such an opportunity may exist in the context of FFA CDEs as well, particularly when scoring written content knowledge examinations and selected skill activities.

How it Works

GradeCam Go! is designed as an instantaneous assessment tool that, in conjunction with specialized, customizable grading sheets (e.g., rubrics, multiple-choice, etc.), uses a camera system to quickly scan and grade a given assessment (GradeCam, n.d.). Prior to using the GradeCam Go! system as an assessment tool, a user (e.g., an SBAE teacher, an FFA CDE superintendent, etc.) must create an account with GradeCam, create a new assignment, and develop an answer key for that assignment. The grading sheets are specific to the GradeCam system and can be generic sheets that can be used by or for any person or assignment, or they can be specifically designated for specific individuals (e.g., from an imported FFA CDE registration list, etc.), depending upon the present need. The camera system can be a webcam on a laptop or desktop computer, a document camera, or a smartphone camera. Identifiers on the bottom of each grading sheet help to provide individual scanning capabilities to each sheet. When a grading sheet is scanned, the answers on the scanned sheet are compared to the answer key previously developed via the GradeCam website. As a result, the user has immediate access to the graded

assessment, allowing him or her to identify the items marked correct and incorrect. Scanning several grading sheets allows the user to identify trends in performance that can be shared with educational stakeholders (e.g., SBAE teachers and students, FFA CDE superintendents, FFA CDE committees, etc.) to identify areas of strength and those in need of improvement. Results can also be uploaded into an electronic gradebook for future recordkeeping and for dissemination to stakeholders (GradeCam, n.d.).

In the context of the present abstract, the Iowa FFA Association staff and various CDE committees, which are composed of SBAE teachers in Iowa, elected to pilot GradeCam Go! as an FFA CDE written examination assessment tool during the 2017-2018 academic year. The Iowa FFA Association staff created a GradeCam account and selected a handful of CDEs (e.g., Agricultural Mechanics, etc.) to serve as the pilot sites. Because FFA chapters were required to pre-register students for each CDE, GradeCam Go! sheets were printed for each student prior to the CDE activities. Iowa FFA Association staff printed and organized GradeCam grading sheets for each registered student. On the day of each CDE, the GradeCam sheets were used during each written examination activity. After collection between activity rotations, each CDE's scoring room team, which was composed of SBAE teachers, individually scanned each grading sheet with a computer webcam. To ensure accuracy of each scanned grading sheet, at least one scoring room team member visually inspected each grading sheet to ensure accuracy. After the initial piloting phase was completed and some minor adjustments to the scanning process were recommended, this process was replicated with additional CDEs during the 2017-2018 academic year. The second year of using GradeCam Go! brought the implementation into additional CDEs (e.g., Agronomy CDE, Poultry CDE, etc.).

Implications

The use of GradeCam Go! was well-received by CDE superintendents, SBAE teachers, and students, and CDE judges. Anecdotally, the technology's ease of use, speed, accuracy, and flexibility with each CDE's design allowed for a reliable system of assessing students' work. SBAE teachers present at each CDE site expressed an interest in adopting GradeCam Go! as a low-cost and effective assessment tool for use within their own programs.

Future Plans & Advice to Others

We anticipate that GradeCam Go! will continue to be used by the Iowa FFA Association to help assess students' work during CDE activities. The Iowa FFA Association plans to incorporate GradeCam Go! into the majority of its CDE activities in the coming academic years. We do recommend that other state FFA Associations consider using this technology for a similar purpose. We also recommend that SBAE teachers consider implementing this technology into their local programs as a student assessment tool.

Costs

Three product package options that vary in price and features presently exist. The Iowa FFA Association purchased four *Teacher/Administrator* accounts that can exchange information with each other. Each account costs $150.00 annually and includes unlimited scans.

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