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Oral & Poster Presentations

001

Poster

Communication Skills Needed by Graduates with Two-Year Agriculture Degrees

Eric Melvin Reed
University of Nebraska, Lincoln, NE

A great deal of scholarly literature shows that oral, written, and interpersonal communication skills are highly valued by employers in a variety of industries and fields. One limitation of research on the communication needs of agriculture employees, however, is the tendency to focus on students who have not yet graduated or on individuals who are predisposed to prefer more education in communication (e.g., communication majors, educators and communication faculty, industry leaders, and students who choose to pursue four-year rather than two-year degrees). This study reports on the results of an online survey sent to 316 students who passed a technical communication, composition, or public speaking course at a two-year technical agriculture college in Nebraska within the past eight academic years (2010-2018). Results from 95 participants indicate that graduates with two-year agriculture degrees tend to agree about the high importance of oral, written, and interpersonal skills in the workplace. However, female participants reported producing most types of communication more frequently than male participants, and urban participants reported producing all types of communication more frequently than rural participants. Female employees and urban employees also perceived communication as playing a more important role in their job history—and in doing their job well. The most frequently used or produced type of communication among respondents was instructions and documentation—3.56 on a scale from 1 (never) to 5 (always). The least frequently used or produced type of communication was scholarly research papers—1.25. These results demonstrate that agriculture students are not a homogenous group in terms of communication skill needs and that many may benefit more from instruction in technical communication than from instruction in composing long-form reflective and argumentative essays or academic research papers.

004

Oral

Teaching Data Analytics to Agricultural Students Using Excel® 2016's Mapping Function

Phil Hamilton
Blackburn College, Carlinville, IL

Michael Woods*
Illinois College, Jacksonville, IL

As precision agriculture technology surges across the agroindustry, there has been a veritable increase of data that is being collected. However, the aptitude to analyze this data within the agroindustry has not improved at the same rate. Routinely, agroindustry employers have expressed concern over the lack of qualified professionals who can analyze data and find useful patterns. This includes being able to mine data and converting data into maps at various levels. Excel® 2016 Workbooks are readily available to small and large businesses alike. They provide a new feature of mapping in both 2-D and 3-D formats, which allows producers and industry representatives to provide visual analytics to help make sound decisions regarding production, marketing, and other decisions. Faculty, from two Illinois Liberal Arts Colleges (Blackburn and Illinois College) collaborated to create a 50-minute agricultural mapping lesson. The objective of this study was to determine whether agribusiness students could learn this innovative technique from an experiential approach. Pre- and Post-tests were given to the students regarding the data analytics process. One class was taught without the benefit of having hands-on capabilities and showed an average improvement of 38%. While two classes were presented with hands-on opportunities and showcased an 82% improvement in understanding data analytics and mining. While data analytics has become a fashionable catchphrase, teaching it presents considerable opportunities in preparing agricultural students

for the demands of the agroindustry. This innovative teaching approach explores a data analytics teaching application for agricultural students and outlines viable opportunities going forward.

005

Oral

Fore...Integrating the Ultimate Business Tool into Agricultural Curriculum

Michael Woods* and Abby Vorreyer
Illinois College, Jacksonville, IL

Many agricultural educators have lived by the “Law of the Instrument” when it comes to soft skill development. Social psychologist, Abraham Maslow described this law as “if all you have is a hammer, everything looks like a nail.” The objective of this innovative teaching approach is to feature an old, but also new, tool available to teaching critical skills needed within a new generation of agricultural graduates. As studies in workforce readiness reveal, recent graduates often lack soft skills that managers are seeking in the workplace, from cooperation and discipline to problem-solving and perseverance. The golf course back nine has long had a reputation of being where business is conducted, and deals closed. It is alleged that golf rewards players who remain calm under pressure and think strategically. As agricultural education research has showcased, these are also virtues desired by agribusiness. This innovative teaching approach presents a new tool for teaching agricultural management students through golf. The hands-on learning experience featured was designed to make learning interesting, relevant to real world agribusiness management, and unforgettable to students. The intensely collaborative and competitive environment added to the class experience and content acquisition. Student, guest and observer feedback about this format has been overwhelmingly positive and it is strongly recommended to other agricultural programs. In the end, the goal of this innovative teaching approach is to further the debate on soft skill development in agricultural education by sharing one agribusiness management courses experience of altering its tools for soft skill development.

006

Oral

Experiential Reflection via Multi-Media Journaling in a Food Ingredient Technology Course

Dawn M Bohn
University of Illinois-Urbana, Champaign, IL

Food Ingredient Technology is a food science elective course that allows students to interact with industry professionals while exploring a variety of common food ingredient categories, including colors, emulsions, flavors, functional carbohydrates, hydrocolloids, proteins, and others. Weekly, industry professionals guide students through a two-hour session of food ingredient label investigation, macronutrient structure evaluation, and structure functionality exploration, while reviewing how processing impacts the functionality of specific food ingredients and how specific ingredients are evaluated for quality and safety. Prior to Spring 2018, the course relied heavily on presentation and professional demonstration but did not incorporate an equitable amount of laboratory interaction and reflection. In the spring 2018 semester, experiential reflection activities were incorporated into the food ingredient technology course. Experiential reflective activities occurred every third week, after two industry speakers presented their topic. On this third week, students met in groups in one of the instructional kitchens with identified and researched recipes that were altered using the ingredient categories explored during the previous two weeks. Students reflected on the appearance, flavor, and texture changes that resulted, as well as considered the changes in processing that occurred. Groups recorded their reflections in online journals, adding pictures and videos from the experiments, and then the groups spent time outside of the instructional kitchen finding popular media, including blog posts, images, articles, movie or song quotes, you tube screen shots, etc., that reinforced their observed learnings. The comprehensive multi-media journal submissions were evaluated for both accuracy as well as visual appeal.

Empathy as Insight for Innovation in a Food Product Development Course: A Pilot Study

Dawn M. Bohn
University of Illinois-Urbana, Champaign, IL

Empathy is the ability to feel and understand the experiences of another individual from his/her perspective. Encouraging empathy in the classroom can provide unique and alternative learning experiences for students, allowing students to gain more than just content knowledge from an assessment. In this pilot study, students in the University of Illinois at Urbana-Champaign Food Science capstone course – Food Product Development – developed 7 novel products that reflect today's food trends, dietary initiatives for Americans, sustainable aspirations, and attentiveness to societal concerns. To embed empathy into the product development experience, student team members followed a 48-hour modified diet or food wasted collection that aligned with the team's selected technical challenge. A College of ACES Teaching Enhancement Grant provided the financial support to purchase the requested food items and scales. After completing their respective 48-hour plan, teams presented on the nutritional, organoleptic, product/package design, social/community-oriented, and accessibility strengths and weaknesses they identified relative to their technical challenge in a consumer awareness presentation. In the presentation, the teams created a "persona" that exemplified their consumer base. Teams also indicated how they would emphasize the strengths and minimize the weaknesses they experienced with their technical challenge in order to create a product that provided empathetic benefits to their consumer. The 48-hour empathetic experience enabled the teams to gain consumer insights that were not previously accessible in the course. In addition, the first-hand consumer awareness made a new social-media advertising campaign possible, introducing a new communication competency to the course.

008

Oral

Jonathan Baldwin Turner's Stories of Resolve, Resilience, Faith, and Freedom

Michael Woods*, Cressie Halberg, Katelyn Hodgson and Samuel Killday
Illinois College, Jacksonville, IL

Archival research in the social sciences has emerged as an insightful perceptive within qualitative research, with contributions from a variety of disciplines, epistemological positions, and methodological approaches. To encourage the use of archival resources in historical research of agricultural studies, this presentation explores archival research around the life-history of Illinois College Professor Jonathan Baldwin Turner, the noted 19th century industrial education crusader that advocated for the land-grant education model and subsequently, education in and about agriculture. Artifacts showcase that Turner was a crusader of change with the resolve of steel in three areas—agriculture, education and religion. In each area, his ideas faced fierce opposition and went against the dogma that prevailed in the 1800's. In many cases, his convictions presented him with public humiliation and personal tragedy by the gentry. Unimaginable now, considering the success of the Land-Grant system, is that such anger could cast a shadow over its formation. From the onset, Turner and his 1851 "Plan for an Industrial University" was tainted at the pulpit and podium. Many of the elite depicted his efforts to establish a "practical and liberal" education for the industrial classes as an illogical frivolous use of resources. They even dubbed it "Turner's folly." Although his farm was burned to the ground by his opposition, Turner still resolved to establish a liberal education for the industrial classes. The objective of this presentation is to unveil archival findings showing Turner's humility, will and ferocious resolve to change the course of agricultural and education.

009

Poster

Archival Research with Agricultural History: Unraveling the Life of Jonathan Baldwin Turner

Michael Woods*, Cressie Halberg, Katelyn Hodgson and Samuel Killday
Illinois College, Jacksonville, IL

Over the course of the last decade, scholarship within social science archival research has presented questions regarding: 1) how the past is researched, 2) the use and analysis of archived artifacts, 3) methodological approaches involved, and 4) the sort of theory drawn on and contributed to by such research. The Illinois College NEH Khalaf Al Habtoor funded Jonathan Baldwin Turner Archive Project explored key methodological ideas and debates and engaged a wide range of archival materials in order to advance important theoretical ideas that shed light on the impact of Johnathan Baldwin Turner's career and life's pursuit. The objective of this poster presentation is to showcase how archival research can enhance access to the unpublished past, enabling researchers to deepen their understanding of the construction of culture and cultural values within the rich and divergent history of education in and about agriculture.

012

Poster

Agricultural Education Preservice Educators' Program Challenges

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Montana State University, Bozeman, MT

Kasee L. Smith
University of Idaho, Moscow, ID

Tyson Sorensen
Utah State University, Logan, UT

Agricultural colleges and universities struggle to produce enough qualified graduates to fill the continually expanding job openings within agricultural education programs. The purpose of this study was to identify curriculum and preparation challenges preservice agricultural educators encounter. The target population included all 2017-2018 senior-level preservice agricultural education teacher candidates who attended the 2018 National Association of Agricultural Educators (NAAE) Region I preservice educator seminar (N=21). Curriculum and preparation challenges were identified through open-ended responses in a researcher modified, online survey. Data collection efforts yielded n=17 usable responses, representing an 80.95% response rate. Responses were analyzed through a directed content analysis approach using pre-determined categories within the Agricultural Education Program Model: 1) classroom and laboratory instruction, 2) application, 3) employment and/or higher education, and 4) careers. Challenges most frequently aligned with classroom and laboratory instruction (n=11; 64.7%), evidenced by a group consensus that stated, "Areas of high concern when becoming an agricultural educator are planning units, classroom management, curriculum building, working with school staff, and implementing quality lessons for students with Individualized Education Programs." Positive university preparation attributes aligned with abilities to "provide great technical courses providing opportunity for in depth knowledge of various content areas: plant science, animal science, mechanics, electricity, agribusiness and leadership." Teacher preparation programs should continue to focus on building preservice educators' classroom management skills while maintaining academic rigor in specific content areas vital to agricultural education.

013

Poster

Helping Students Develop and Mature as Scientists

Debra S. Korte and Shelly J. Schmidt
University of Illinois-Urbana, Champaign, IL

Attracting and retaining students in STEM fields, including those in Colleges of Agriculture, is a current critical need. Our approach was to embed an underlying objective into an existing science course that goes beyond just teaching students scientific principles, but rather aims to help students develop and mature as scientists. To enhance students' efficacious beliefs in their ability to be a successful scientist, five research-based pedagogical practices (creating community, learning deeply, team problem solving, learning by doing, and mentoring) were weaved into the fabric of the course. Research objectives were to: (1) assess

the influence of the five practices on students' self-efficacy as a scientist and (2) measure students' perceived value of these practices, activities, and assignments. Overall, students who participated in the mixed-methods questionnaire (5-point Likert scale, N=66) indicated strong agreement that the course enhanced their belief in their abilities as a scientist (M=4.53). Students strongly to somewhat strongly agreed that each construct of the underlying course objective was achieved: learning deeply (M=4.64); creating community (M=4.42); learn by doing (M=4.19); team problem solving (M=4.17); and mentoring (4.12). Students perceived the value of the practices and the associated course activities and assignments from extremely to moderately valuable, with learning by doing as most valuable (M=4.74) to peer evaluation as least valuable (M=3.53). To foster students' belief in their abilities to be a successful scientist, educators should focus on helping students develop and mature as scientists, by doing the work of a scientist, not just by teaching them about scientific principles.

014

Poster

Employing Crowdsourcing Practices to Enhance Exam Wrapper Usefulness and Student Engagement

Debra S. Korte and Shelly J. Schmidt
University of Illinois-Urbana, Champaign, IL

The exam wrapper is a metacognitive tool used to improve exam preparation and performance. Researchers used this assignment in the introductory food science and human nutrition course for three previous semesters. Compared to other course assignments, students reported perceived usefulness of exam wrappers as only Moderately Useful. Researchers hypothesized the assignment could be significantly improved by involving students in its redesign. Thus, the objectives of this research were to use crowdsourcing practices (defined herein as putting many minds to work on a single problem) to enhance the: 1) usefulness and 2) students' understanding, ownership, and timeliness of the exam wrapper assignment. Based on students' ideas, generated individually and in small groups, the exam wrapper was redesigned and implemented after exams 2 and 3. Students were asked, using 5-point Likert-scale responses from strongly agree (5) to strongly disagree (1), to evaluate the usefulness of the exam wrapper and their experience with crowdsourcing. Regarding usefulness, students agreed (3.9±0.91) the redesigned exam wrapper was a much more useful tool for improving exam preparation practices compared to the standard 3-question exam wrapper used after exam 1. Regarding crowdsourcing, students agreed that crowdsourcing was an effective tool for improving the exam wrapper (4.1±0.70) and should be used more regularly (4.2±0.95). They also agreed that crowdsourcing helped them better understand the assignment's purpose and value (3.7±0.90), take more ownership of it (3.9±0.96), and better relate to it (3.9±0.90). Based on these findings, researchers determined crowdsourcing to be an effective tool for garnering students' ideas and perspectives.

016

Oral

Outcomes using a Flipped Classroom and Experiential Learning at a University Dairy Farm

Andrew B. Conroy*, Catherine E. Overson and Peter S. Erickson
University of New Hampshire, Durham, NH

Four hundred and seventy-seven alumni of the University of New Hampshire's (UNH) Cooperative Real Education in Agriculture Management (CREAM) course (1998-2018) were surveyed regarding their perspectives in the course with experiential learning and a flipped classroom environment. UNH CREAM teaches students to manage, care for and milk a herd of 25 Holstein cows daily for 2 semesters. Students plan and facilitate activities in the classroom 4 hours/week, while also developing leadership, teamwork and communication skills through assigned team-based activities and critical decision making for the herd. Using both open and closed ended questions, responses came from 220 alumni, comprising 187 women and 33 men. Majors primarily included pre-veterinary medicine (121) and animal science or dairy management (67). Within 24 months of graduation 67 alumni went to veterinary school, 51 to production agriculture, 29 to graduate school and others to work in areas related to agriculture, companion animals and zoo animals as well as human health fields. The highest ranked skills students learned were animal

health practices, animal nutrition, cattle handling, reproduction, and milking. The five highest ranked interpersonal skills were teamwork, group decision making, oral communication, leadership, and initiative. Alumni strongly agreed that CREAM's experiential strategies were effective, provided an understanding of the dairy industry and agreed that the flipped classroom approach was an effective teaching strategy. Alumni agreed problem solving on the farm and participation in the course had an impact on their career. The CREAM program was recognized as being a valuable experience by graduate and veterinary schools.

017

Poster

Nanotechnology 2020: Preparing Students for Nanotechnology Applications in Agriculture and the Life Sciences

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University of Arizona, Tucson, AZ

Brent Nelson
Northern Arizona University, Flagstaff, AZ

Nanotechnology, which generally involves particles and devices developed and used at the scale of 100 nanometers or less, has the potential to impact society in a myriad of ways. Much attention has been paid to the opportunities for nanotechnology in medicine, but opportunities for nanotechnology in agriculture also abound. For example, nanoscale compounds have been developed to treat plant disease in highly targeted and controlled ways with minimal collateral damage to surrounding crops and soils. Nanotechnology may offer further solutions that could serve as sustainable solutions for a variety of pressing issues, including global food insecurity, arid land expansion, and environmental degradation. Achieving the promise of nanotechnology interventions in agricultural production requires the development of a highly-trained workforce that spans the domains of research and development, nanoscale tools and techniques, and business strategy and innovation. Accordingly, the "Nano 2020" project was implemented with USDA NIFA Higher Education Challenge (HEC) program funding to promote and support instructional activities at the intersection of agriculture, human sciences, and nanotechnology. The project centers on a multi-university consortium that has built an organizational platform and intellectual network from which to create novel instructional curricula focused on the development and application of nanotechnologies across a diverse set of agricultural, life sciences, and engineering disciplines. This curriculum includes not only nanoscience tools and techniques but also design and entrepreneurship. The proposed poster will describe the project (including learning outcomes) and illustrate innovative instructional outputs that include online curricula, virtual reality teaching tools, and experiential learning programs.

018

Poster

International Teaching Experience in Soil Science at China Agricultural University

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University of Illinois-Urbana, Champaign, IL

Jianying Shang
China Agricultural University, Beijing, China

Increased enrollment of Asian students in undergraduate soil science courses at the University of Illinois at Urbana-Champaign (UIUC), especially Chinese students, often makes the teaching challenging. The Asian students have difficulties in understanding examples from North America in conventional textbooks. Understanding their knowledge in agricultural science based on their geography and culture is needed to make our soil science course more global. The objective of the international education activity was to enhance the global adaptation of our soil science courses through an experimental short summer course in soil science at China Agricultural University (CAU). The long-term goal of this education project is to contribute to global teaching and learning in agricultural science. In 2018, the course, which covered soil-water relations, soil salinity, soil mineralogy and soil acidity, was offered to twenty-nine graduate students from CAU in 2018. The presentation discusses the evaluation of their English skill, their style of learning,

and their knowledge of soil science, exam performance, the outcome of oral presentation assignments in English, discussion, their use of my office hours and the future direction/short summer courses to improve my instructional skills to accommodate international students in my soil science courses at UIUC.

019

Oral

The Nature of Teaching: An Engaged Approach to K12 Program Delivery

Rebecca Koetz* and Rod Williams
Purdue University, West Lafayette, IN

Robert Cordes
Maine Department of Inland Fisheries and Wildlife

The Nature of Teaching is a Purdue Extension program that provides resources for K-12 teachers and non-formal educators to teach STEM standards in the context of natural resources. All resources are pilot-tested, expert-reviewed, and free to download from www.purdue.edu/nature. This program has expanded exponentially in the last two years from thousands of downloads to hundreds of thousands of downloads, became one of the first signature programs for Agriculture and Natural Resources Extension at Purdue, and been adopted by the Maine Department of Inland Fisheries and Wildlife Agency. This dramatic increase in usership is due to an array of factors including having a driven team with diverse expertise, forming partnerships with diverse groups, providing accessible professional development opportunities, incentivizing program use, assessing student responses, recognizing educator success, facilitating discussion and reflection, and being receptive to program users leading program expansion. Presenters will elaborate on how these factors have contributed to the success of the Nature of Teaching program and how it can be adopted across the country.

020

Poster

Student Interest in a Professional Row-Crop Farm Management Academic Program

Bradley D. Borges, Deacue C. Fields, Catherine W. Shoulders and Donald M. Johnson
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Eastern Arkansas is heavily dependent on production agriculture, with row-crop farming being a major economic driver. Increases in farm size and technological complexity, combined with a growing number of absentee landowners has led to an increased demand for professional farm management services. The purpose of this study was to determine undergraduate agriculture students' interest in a professional row-crop farm management academic program, internships on eastern Arkansas row-crop farms, and professional row-crop farm management careers in eastern Arkansas. Of the 283 responding undergraduate agriculture students, 37.1% were interested in the row-crop farm management academic program, 74.3% were interested in completing a full-semester, for-credit internship on an eastern Arkansas row-crop farm, and 35.9% were interested in professional row-crop farm management careers in eastern Arkansas. Two binomial logistic regression models were estimated to predict interest in the proposed academic program and in professional row-crop farm management careers in eastern Arkansas. The first model indicated males (OR=3.04) and students with row-crop experience (OR=5.73) were significantly ($P<0.001$) more likely to be interested in the professional row-crop farm management program. The second model indicated agricultural business majors (OR=3.26, $P<0.001$) and students with row-crop experience (OR=1.89, $P<0.05$) were significantly more likely to be interested in professional row-crop farm management careers in eastern Arkansas. These results indicated sufficient student interest to justify continued discussions concerning the development of a professional row-crop farm management academic program.

021

Oral

Agriculture Teacher Retention Among Tarleton Agricultural Education Graduates

C. Faul, R. Tarpley*, M Shockey, D. Frazier and C. Andrew
Tarleton State University, Stephenville, TX

The purpose of this research was to determine the retention rates of Agricultural Education graduates from Tarleton State University. Research objectives that guided this study included: (1) describe the population of agriculture teachers who graduated from the Fall of 2012 to the Spring of 2017, (2) identify if agriculture teachers who have graduated from Tarleton State have adequate resources or administrative support, and (3) identify factors that contribute to agriculture teacher retention rates. The research model for this study was descriptive/correlative. A survey instrument was used to evaluate the current status of the graduates. Survey items included demographic items, mentorship, and administrative support. Most of the respondents indicated they have administrative support and are getting the essential resources for their program. Through this study, the researchers found that of the respondents that have not started teaching or are no longer teaching, most of them are still working in the agriculture industry or are teaching, just not teaching agriculture. The researchers recommended that teachers continue to advocate for their programs and cultivate a positive relationship with their administrators. Additionally, it would be beneficial if more agriculture teachers moved into administrative positions to continue this positive relationship between teachers and administration.

023

Poster

The Impact of Extension Program Planning on Low-Income Families

M. Flores, A Gregory and R.S. Tarpley*
Tarleton State University, Stephenville, TX

This study investigated the educational impacts of the Hidalgo County AgriLife Extension program – Growing and Nourishing Healthy Communities (GNHC) program on low-income families. The program was implemented in the San Carlos Housing Center in Hidalgo County, Texas to assist individuals and families that were living in poverty and have dietary intakes which fell short of current RDA recommendations. The program was assessed with pre- and post-surveys which determined whether or not there were increases in skills and knowledge as a result of the GNHC Program. The purpose of the study was to determine the effectiveness of a family needs and wellbeing educational program to low-income families. Research questions: (1) What strategies were utilized to market extension programs to low-income communities? (2) When given these workshops, did the participants gain any skills and knowledge? Within a descriptive design, survey data was collected from the 2017 GNHC workshop. There were 115 participants who completed the program and 85 submitted a post-survey. Participants were primarily female (74%) and Hispanic (98%). Overall, over 86% of the participants rated their gardening knowledge and skills as either “good” or “excellent” at the end of the program. Marketing strategies were discussed, and 2018 marketing programs were developed by the Texas A&M AgriLife Extension Service that could potentially reach more low-income families.

024

Oral

Student Perspectives of Instructional Modules to Improve College Students' Communication Skills

Theresa Pesi Murphrey*, Shannon Norris and Holli R. Leggette
Texas A&M University, College Station, TX

Providing opportunities for students to enhance their communication skills is critical. However, the process of providing those opportunities can be time-consuming for instructors. In an effort to meet this need, we created seven instructional modules focused on seven areas of communication: listening effectively; communicating accurately and concisely; communicating orally; communicating pleasantly and

professionally; communicating in writing; asking effective questions; and communicating appropriately and professionally using social media. To ensure the modules were engaging and educational, we sought student feedback during the module development process. We held three focus group sessions (N=62; n1=24, n2=18, n3=20) with students who completed one of the modules to gain an understanding of student perspectives. First, we recapped the key components of the module and, then, guided the session with questions focused on ease-of-use, aspects they liked or did not like, and recommendations for improvement. Students reported that the modules were hands-on, learner-centered, and highly functional. Students said the fillable worksheets and the formative quizzes throughout the module were practical and recommended the modules be improved by adding clear and concise instructions regarding the use of the fillable PDF files, placing a frequently-asked-questions tab to each section of the module, and providing stronger feedback after the formative assessments. Overall, students reported the modules were easy to use and benefited their learning. Instructional modules are only beneficial if students engage in them; creating student-centered instruction will enhance the likelihood of engagement.

025

Oral

Let's Review: Types of Feedback Given in An Agricultural Writing Intensive Course

Becky Haddad*, Kellie Claffin* and Josh Stewart
Oregon State University, Corvallis, OR

Employers and the media call for college graduates to be effective communicators, yet 85% of students across disciplines are at a basic writing level. Universities are adopting writing intensive courses to increase student-writing skills. At Oregon State University required writing intensive courses are discipline-specific to prepare student writers for future careers within their field. A common technique utilized in writing intensive courses is feedback through peer reviews. Our study sought to describe the types of feedback (affective, cognitive, and metacognitive) used by seniors in a Writing Intensive Course within an undergraduate Agricultural Sciences degree. In addition, this study quantified a change in peer-review feedback over the course of an academic term. Students used each type of feedback throughout the duration of the course but relied heavily on affective and cognitive feedback (63% and 80% of combined feedback between both categories in initial and final feedback, respectively). Further efforts are necessary to provide direction and rigorous evaluation in the writing intensive course. Continued research is necessary to examine instructional strategies in place and to provide a more thorough evaluation of the peer feedback structures in place. Efforts to understand the benefits of quality peer feedback as a critical component of the revision process should facilitate effective practice in writing courses within agriculture and agricultural education across the country.

026

Oral

Use of Analogies to Enhance Student Engagement and Learning

Zhiyong Cheng
University of Florida, Gainesville, FL

Albert Einstein said, "If you can't explain it simply, you don't understand it well enough". In the course of Nutrition and Metabolism, students highly appreciate the instructors explaining complex concepts and metabolic pathways with simple and easy-to-understand language. However, it is not without a challenge, particularly when the content is outside students' previous experience. We found that use of analogies could effectively simplify concepts that are complex or abstract and facilitate student engagement and learning. Caution should be exercised, however, to ensure that students remember not only the analogy but also the content. We noted that use of analogies helped students construct their knowledge. Indicative of active learning and good understanding of the content, students even showed their creativity to make their own analogies in the class of Nutrition and Metabolism. This presentation presents a research-based rationale for the use of analogies in the classroom, provides guidance on how to effectively use analogies, illustrates specific examples of subject-focused analogies, and provides a qualitative assessment of student learning in the classroom.

Making Connections: A Multi-Learning Community Assessment

Ryan Musselman, Amy Jones and Dennis Buckmaster
Purdue University, West Lafayette, IN

To better understand the motivations, effectiveness, and outcomes of students participating in Learning Communities, Purdue University College of Agriculture instructors surveyed their first semester freshmen enrolled in the Discovering Agribusiness, Agriculture Technology and Innovation, and Study Plants @ Purdue Learning Communities. As a reflective assignment, students were required to complete the survey indicating their motivations for enrolling and outcomes achieved but were asked to give permission for their responses to be used in the research study. There were 55 usable responses, representing 74.32% of enrolled students in the researched learning community courses for the fall 2018. Students indicated they were most motivated to join the community to make connections to industry, careers, and professionalism, followed by learning new things and fellowship and peer networking. Students reported that during the learning community experience they felt they understood the material, were satisfied with their performance and put in a lot of effort. After participating they agreed they belonged at Purdue and in agriculture, in their abilities to achieve their goals, and that they learned something new they were interested in. Students also agreed they would recommend other students participate in their learning community. The researchers asked students to indicate the communities' contribution to their leadership and professional development competencies, utilized by Purdue University. The highest rated competency contributions were personal responsibility, verbal communication, initiative and follow through, and to listen and observe. This data is useful for learning community instructors to better develop community courses and events that increase student connections and learning.

Evolution of a Crop Practicum for Experiential Learning in Agronomy

Brad Ramsdale*
University of Nebraska - Nebraska College of Technical Agriculture

A key characteristic of the educational philosophy at the Nebraska College of Technical Agriculture is providing experiential learning opportunities to our students in preparation for their future agricultural careers. The learning farm laboratory, consisting of 240 crop acres, is a primary resource to support experiential learning in the agronomy program. In 2015, a crop practicum program was initiated to improve student integration into the crop production on the college farm. An overview of the practicum's design and feedback from students will be discussed. The crop practicum program is required for the Associate of Applied Science degree in Agronomy and assists in the assessment of the program outcome "Students will be able to apply economically sound and environmentally sustainable agricultural crop production practices in the Great Plains." Crop practicum is a three-course sequence with one course taken during each of the student's first three semesters. The experiential learning component had two primary objectives originally, which were to allow students to make the production decisions for producing a crop on the college's farm and to be able to conduct a portion of the actual field operations. Due to growing season, weather, and semester schedule limitations, the practicum has now evolved to emphasize the management decisions with conducting field operations as a possible accessory learning experience. The current model is five student groups competing side-by-side in irrigated corn and irrigated soybeans to determine the most profitable management system. Students have consistently documented the practicum as one of their most valuable learning experiences.

**Approaches to Teaching Communication Skills: Improving Students' Skills
One Activity at a Time**

Jean Parrella, Theresa Pesi Murphrey and Holli R. Leggette
Texas A&M University, College Station, TX

The agricultural industry is faced continuously with skepticism from consumers and activists; therefore, equipping graduates to discuss controversial or commonly misunderstood agricultural issues effectively is essential to the industry's future. Teaching communication skills can be difficult as these skills require behavior change and, thus, require unique approaches different than teaching basic knowledge and understanding. Often, agriculture and science teachers do not have the time, nor the expertise, to prepare instruction to deliver soft skill training to students. The purpose of this study was to understand if and how expert teachers teach communication skills in the classroom with the goal of developing a toolkit available to all educators. We conducted an integrated literature review accompanied by in-depth interviews with agriculture and science teachers. The literature points to the use of case studies, role-playing activities and closed Facebook groups as methods used to encourage the development of communication skills in both communication-based and science-based classrooms. Interviews revealed the merit of oral presentations followed by classroom critique, in addition to not accepting "yes" or "no" responses from students. Teachers also required students to create a sales pitch to translate the importance of knowing how to craft their message for an intended audience. These approaches enable students to improve their relational and active listening skills and to connect theory and practical application as they address big-picture problems. Furthermore, access to specific teaching methods allows teachers to incorporate communication skills curriculum into their existing content that will prepare students with technical skills and communication skills.

Examining Inquiry-Based Learning Stages of Concern for High School Agriscience Teachers

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University of Nebraska, Lincoln, NE

Christopher T. Stripling
University of Tennessee, Knoxville, TN

There is documented need for improvement of science comprehension amongst high school students in the United States, and inquiry-based learning is a recommended teaching strategy to improve science comprehension. Several researchers have focused on examination of learning outcomes for students, but few researchers have investigated the concerns of teachers who may wish to adopt inquiry-based learning as an instructional strategy. The objective of this study was to examine how participation in a teaching professional development program focused on inquiry-based learning methods effected the concern stages of 10 Midwest agriscience teachers considering the use of inquiry-based learning in their classrooms. Inquiry-based concerns were measured before and after a year-long professional development program using the stages of concern questionnaire. The professional development program introduced participants to inquiry-based learning methods, provided four inquiry-based learning lessons for use in the participants' high school classrooms, then asked participants to develop and present their own inquiry-based learning lessons. Results indicated that while some participants showed a positive progression in their stage of concern, most participants did not progress in their concern stage, and some developed increased resistance to inquiry-based learning as a teaching strategy. This suggests that some teachers may need more robust and tailored support when adopting inquiry-based learning methodologies for their classrooms. Teachers should seek additional professional development opportunities when implementing inquiry-based learning in their classrooms and may consider finding a colleague that uses inquiry-based learning and asking them to provide mentorship and guidance.

031

Poster

Alumni, Faculty and Employer Insights into Agricultural Operations Management Curricula

Adam Watson*, Kati Migliaccio and Wendell Porter
University of Florida, Gainesville, FL

In 2018 the University of Florida (UF) Agricultural Operations Management (AOM) Task Force in the Department of Agricultural & Biological Engineering (ABE) was formed to identify areas within the AOM program with the overall goal of improving AOM curriculum through enhancement, revision and development. The task force surveyed 438 alumni, 38 ABE faculty, and interviewed five industry representatives. The specific objectives of the research were to: 1) identify knowledge and skills needed by AOM undergraduate students, 2) identify tracks or concentrations within AOM that would reflect needs of the future work force and student interest, 3) develop partnerships with other colleges and departments to strengthen the program, 4) recruit and attract top, diverse talent, and 5) expanded graduate education opportunities. From results of the survey and interview activities the task force noted strengths of the program which include developing critical, analytical, independent thinkers with proficiency in technology and business. Yet communication and interpersonal skills as well as familiarity with and the application of emerging technologies in agriculture such as drones, robotics, and sensors were identified as areas that AOM students would benefit from in their professional careers. From these findings, efforts made by the task force resulted in the proposal of new courses, the creation of new recruitment and program promotional materials as well as research proposals and the formation of a synergistic partnership with the UF College of Design, Construction and Planning to provide complementary instructional to undergraduate students.

032

Poster

Creating Urban Food Citizens Through STEM: Teaching Agricultural Education with Science

Chasity Dawn Tompkins* and Casey Mull
University of Georgia, Athens, GA

With populations within urban communities expanding, the need for “sustainable, healthy, and affordable food” (Montenegro de Wit, 2014) increases, along with the need for people to understand and advocate for urban agricultural systems. A grant from Children, Youth, and Families at Risk supported an effort to promote food citizenship in youth. Project GROWL is an urban agriculture after-school program for youth who were at risk for not completing high school but who also showed promise in STEM related academic subjects. Aligning closely with the USDA REE Strategic Goal of Education and Science Literacy, programming intends to “recruit, cultivate, and develop the next generation of scientists, leaders, and a highly-skilled workforce for food, agriculture, natural resources, forestry, and environmental systems, and life sciences to out-educate our global competitors” (USDA Research, Education, and Economic Strategic Plan, 2012). In connection with these strategic goals, Project GROWL aims to increase STEM focus at the middle and high school levels that is highly relevant to agricultural sciences. Project GROWL also “utilizes pre-collegiate programs...to increase awareness to all youth about career opportunities in agriculture (USDA Research, Education, and Economic Strategic Plan, 2012). The objective of the program is to have youth influence the policy of local food, agricultural, and natural resource systems while negotiating often conflicting views, perceptions, and evidence of urban agriculture. This presentation provides a quantitative assessment of science literacy and competency and a qualitative reflection of youth and parent perspectives to an urban agricultural program.

033

Poster

Success of the Early College High School – Certificate of Competence in Agripharmatech Graduates in STEM

Hongwei Li, Ingelia White* and Teena Michael*
Windward Community College, Kaneohe, HI

Windward Community College (WCC) launched a three-year Perkins funded Early College High School (ECHS) - Certificate of Competence in Agripharmatech: Plant-Food Production and Technology (CO PFPaT) in Fall 2016. It is a 9-credit program to be completed within two semesters by taking three classes: Identification of Tropical Plants, Orchid Culture, Ethnobotany or Independent Study. The objective of the program is to prepare students to enter STEM workforce and pursue STEM certificates and degrees. The project has been highly successful with the total number of CO Agripharmatech graduates and the average completion rate steadily increasing every year. Twelve students from two high schools received CO PFPaT diplomas with a completion rate of 53% in 2017. Another forty-three CO graduates from three high schools reached 84% completion rate in 2018. In 2019, sixty-four more CO graduates from three high schools showed an 89% completion rate. Today, 15 ECHS-CO PFPaT graduates of 2017 and 2018 are pursuing the Certificate of Achievement in Agripharmatech and associate degrees at WCC. Approximately 70% of the total of three-year ECHS-CO PFPaT graduates are pursuing STEM degrees at local and mainland universities. Thus, preparing them to enter the higher-paying STEM-related workforce. The success of ECHS-CO PFPaT at WCC can be attributed to great teamwork and support provided by college and high school administrators, faculty and staff, as well as most rigorous and practical hands-on laboratory and field practicum. Two high schools plan to continue a self-supported EC-CO PFPaT project beyond 2019.

034

Poster

Agricultural Mechanics: Find, Fix, Drive and Sell

Dana J. Ladner*, Trenton Smedley, Russell Plaschka and Kerry Wefald
Kansas Department of Agriculture

The 2016 Workforce Needs for the Agriculture Industry in Kansas Survey indicated there were 558 job openings in 71 specific agricultural careers in Kansas. Of these vacancies, 215 (38.5%) were in agricultural mechanics. Beginning in 2017, the Kansas Department of Agriculture (KDA) surveyed high school students attending Kansas FFA Convention Career Fair and Kansas FFA Career Development Events to gauge student career interest. The results were categorized by occupation profiles defined by the United States Department of Labor and linked with AgCareers.com career profiles. When adjusted to align with the AgCareers.com pathways, 55 (10.7%) of the responses were in the agricultural mechanics pathway. To educate students on the need for qualified employees in agricultural mechanics and increase student interest in these occupations, KDA developed a hands-on agriculture equipment dealership experience. The program was launched in a collaborative effort between KDA and Carl's Sales and Service, Inc, who hosted the event. Twenty-one students from four high schools interacted with dealership employees on a tour of the facilities. An instructor from a Kansas technical school presented on 2-year post-secondary education opportunities in agriculture power. In four hands-on rotations, students used computer software to locate implement parts, performed general maintenance in the mechanics shop, sold a tractor in a sales simulation and drove a tractor. Upon completion of the event, nearly half the students in attendance indicated they were interested in pursuing a career in agricultural mechanics. This event is design for implement dealers to utilize the template to give students similar experiences

035

Poster

Career Options in Agriculture: Expanding Horizons

Dana J. Ladner*, Trenton Smedley, Russell Plaschka and Kerry Wefald
Kansas Department of Agriculture

The Kansas Department of Agriculture (KDA) estimates the agriculture, food and food processing sector contributes approximately \$65.7 billion to the Kansas economy. These industries employ 248,216 people, which equates to 12.9% of the entire Kansas workforce. A need exists for educators to know projected job openings and how KDA assists in developing a qualified workforce for the agriculture industry. High school students attending Kansas FFA Convention Career Fair in 2017 and 2018 were asked to list their dream job. The survey generated 513 responses in 2017 and 2018. (2019 to be added) The results were categorized by occupation profiles defined by the United States Department of Labor and then linked with career profiles from AgCareers.com. Students demonstrated the most interest in careers in animal science

with 222 (43.3%) of the responses. The 2016 Workforce Needs for the Agriculture Industry in Kansas Survey anticipated agricultural mechanics to have the largest percentage of workforce vacancies. Only 55 (10.7%) of the respondents listed a career in a technical/mechanical field. With the goal of establishing a “best-in-state plus” workforce, KDA should expand conversations regarding career opportunities within agriculture by communicating projected vacancies and the addition of new and emerging occupations. KDA has worked with AgCareers.com and the Kansas Association of Agriculture Educators (KAAE) to provide agriculture teachers with educational resources and support experiences that engage students in career exploration. These resources provide students information about workforce needs, educational requirements and income that enables them to make educated decisions regarding their career and post-secondary education.

036

Poster

21st Century Skills: Perceptions of School Based Agricultural Education Teachers

Kisia Weeks, Rebecca G. Lawver, Tyson Sorensen
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Industry has recognized that students need soft skills to succeed in today's workforce, these soft skills are known as 21st century skills. The Partnership for 21st Century Learning separates these skills down into three sections: learning, literacy, and life skills, which are further broken down into twelve individual skills needed for success in the 21st century. Encompassing 21st century skills into the school-based agricultural education (SBAE) classroom will engage students in the learning process and prepare them to succeed in a growing global economy after graduation. While education is currently stressing the importance of teaching 21st century skills in the classroom, the question remains: do agriculture teachers possess these skills themselves? When a teacher and a schoolwork together to build upon the basis of applying core content learned, students become more engaged, take an active role in the learning process, and are prepared to thrive in a growing global economy. This project sought to describe SBAE teachers' perceived level of importance, perceived knowledge level, and perceived ability to teach 21st century learning skills. A sample of teachers was gathered from the National FFA Organization to include 500 teacher's nationwide representative of all regions. Respondents indicated a high level of perceived importance and a moderate level of perceived competence when incorporating 21st century skills into the SBAE classroom.

037

Poster

Utah 4-H Performing Arts Needs Assessment

Oakley G. Perry and Rebecca G. Lawver
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Studies have shown the numerous benefits to performing arts programs for youth in areas of confidence, creativity, and academics. These benefits have prompted some state 4-H programs to create a statewide performing arts group. This needs assessment sought to determine the 4-H faculty and staff's perception of creating a statewide 4-H performing arts group in Utah. County based extension professionals who had a 40% or higher appointment for 4-H were sent an anonymous survey link to complete the assessment. The assessment had a 73% response rate among this group. First, 4-H professionals were asked about current arts programs (both performing and visual arts) and what types of arts programs are offered in their counties. Secondly, they were asked if there would be interest in a statewide performing arts group from their youth, and finally were asked if they had youth interested in the different disciplines the program would offer (vocal, instrumental, dance, and productions). Agents and staff then indicated whether volunteers from their counties who would like to help with the program. The assessment also investigated the current number of counties that had STEM (science, technology, engineering, and mathematics) programs through their county 4-H program and if individuals believed that the arts were connected to STEM programs. Most responses were supportive of a 4-H performing arts program; however, most responses were unsure whether the arts and STEM are connected.

038

Oral

Using a Team-Based Online Simulation to Promote Undergraduate Student Learning Outcome

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This session will provide a live demonstration of the Recurrence Signature Case Study (RSCS); an online multiplayer game-like simulation case-study for teaching participants how to work in teams using real-world scenarios in a business setting. The RSCS was implemented by faculty at a major land grant institution in an undergraduate class offered through a department of agricultural education and communication. Groups of five students faced decisions that generated cascading crises requiring the group to work closely together to resolve satisfactorily over the course of a 16-week semester. Surveys, simulation performance, and overall class grades demonstrated that students preferred the simulation over traditional assignments, perceived better learning outcomes in leadership and team-based coursework because of participation, perceived stronger interpersonal bonds with group members, and that performance in the simulation positively correlated to overall course success. 75% of respondents indicated that they agreed or strongly agreed that the RSCS provided insights into teamwork, improved their ability to solve problems in teams, and helped them understand concepts taught in the class. In addition, 83.3% indicated that they enjoyed participating in the RSCS and 75% indicated that they would prefer to see similar simulations in other college courses. Most importantly, students indicated that their level of knowledge regarding communication and leadership in groups in teams increased significantly from the start to the end of the simulation ($r=0.619$, $p<0.002$).

039

Oral

Effect of an Encouraging Email on Undergraduate Students' Motivation to Learn Throughout a Semester

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Oklahoma State University, Stillwater, OK

Limited studies investigate the effect of different modes of rapport-building between faculty and students on students' motivation to succeed in a course. This study determined the effects of an encouraging pre-course email on undergraduate students' motivation to learn in three plant and soil science courses and two oral and written agricultural communication courses during the first, eighth, and sixteenth weeks of the semester ($N=630$). One-half of the students were randomly selected to receive an encouraging email from their instructor before the first-class session ($n=316$). Motivation data were collected at three points during the semester using an adapted Course Interest Survey (CIS) administered to all students enrolled in the courses. Results from a two-way ANOVA indicated there was not a statistically significant interaction between the effects of an encouraging email and the week of the semester on students' motivation ($F(8, 1441) = 0.612$, $p=0.769$). However, motivation throughout the semester showed a statistically significant difference between weeks one and week eight for all students ($p<0.01$) and was statistically significant between courses ($p<0.05$). Although receiving an encouraging email prior to the beginning of the class did not influence students' motivation throughout the semester, future research should assess how other encouraging communication can be utilized best to build rapport and motivate student success. Further investigation to understand the changes in student motivation throughout the semester also may help faculty identify key periods when encouragement is most beneficial to student success.

040

Oral

Integrating Intercultural Competencies into Agricultural-Based Study Abroad Immersion Experiences

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Purdue University, West Lafayette, IN

Experiential learning activities provide students with opportunities for direct hands-on learning. These real-life experiences involve undergraduate learners in completing tasks, solving problems, or conducting projects. One such activity, study abroad, presents unique opportunities for students to discover course material in a remarkable setting. Although the number of undergraduate students participating in international study abroad programs continues to grow, there is a need for clear learning outcomes to be established. Students often return to campus after completing a study abroad program claiming to have strengthened interpersonal and intercultural skills and increased global competence. However, how do we measure this increase and what strategies can be utilized to assist students in their intercultural development? If the learning outcomes include the development of intercultural effectiveness, integration of reflection and intentional intercultural guidance and mentoring is essential. The objective of this workshop is to provide information on how faculty can develop student intercultural competencies in the context of study abroad programming. Workshop participants will learn best practices and skills to implement activities aimed at increasing intercultural competencies. Strategies to reach this goal at various stages of the program will be discussed. These include the pre-departure and post-departure portion of the course as well as during the international experience. Guided reflections, carefully crafted assignments, and discussion are critical for study abroad participants' intercultural development.

041

Oral

Stories of Community Food Work: Community-University Dialogue for Transformative Learning

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Virginia Tech, Blacksburg, VA

Jenny Schwanke
Hale Community Garden, Blacksburg, VA

Numerous definitions, practices, and policies underpin the complexities of food security as a 21st century wicked problem. Institutions of higher education are increasingly providing innovative, community-university learning experiences focused on understanding food access, availability, and affordability challenges from a critical and applied perspective. We illustrate the framework, outcomes, and learning implications of a community-university storytelling project that took place as an experiential component of a course on food security and community development at Virginia Tech. The Politics and Practice of Food Security and Social Justice graduate-level course drew upon the concept of “community food work” to reflect inclusive, systems-level, and community-based educational practices to cultivate food security and food system sustainability. From that perspective, we have three aims for this presentation. First, as a community-university initiative, we describe how students utilized narrative inquiry methodology to develop and analyze “stories of the community food work” based on the experiences of community garden participants who have a history of growing food and providing garden education, neighborhood harvest programming, and monthly meals. Second, we share student’s narrative inquiry findings to understand the everyday practices of community garden participants working toward the related issues of health equity, community resiliency, and ecological sustainability. Third, we illustrate the educational design and outcome of our culminating community garden storytelling event co-organized by the garden and university partners. We conclude with recommendations for using narrative inquiry and community storytelling as transformative learning approaches to build personal, professional, and community capacity for food systems change based on dialogue.

Teaching Plant Propagation with Microgreens in Secondary Agriscience Classrooms

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Clemson University, Clemson, SC

Kailee Morris
Madison County Central School, Madison, FL

Victoria Willis
Bamberg High School, Bamberg, SC

In professional development seminars conducted at Clemson University, a total of twenty-three South Carolina secondary agricultural education teachers participated in 90-180-minute interactive laboratories focused on seed-based plant propagation. The laboratory exercise specifically focused on microgreen production. Microgreens are small, young plants that can be sown and harvested within seven days. Microgreens are popular with restaurants and are highly dense in many nutrients. The research objectives were to determine how teachers can utilize microgreens as a science, technology, engineering, and mathematics (STEM) lesson within the agriscience plant science curriculum, contrast light-emitting diode (LED) and fluorescent light and its effects for producing nutrient dense microgreens and growth, and to examine if microgreens grown in a classroom setting are a safe food product with an acceptable shelf-life. A pretest and posttest were administered during the professional development seminars. The pretest investigated current methods in-service agricultural education teachers used to teach seed-based propagation and the teachers' perceived knowledge of microgreens. On average, the teachers rated themselves as having little to some knowledge of microgreen use and production. The posttest evaluated the likelihood of classroom incorporation, educational materials needed to support the laboratory exercise, and perceived knowledge after completion of the laboratory investigation. After participating in the professional development seminars, the teachers indicated a positive self-efficacy of their ability to successfully implement microgreens into their horticulture plant propagation unit of instruction, as well as a willingness to incorporate the STEM laboratory investigation lesson into the plant science curriculum in their secondary agricultural education programs.

Let's Talk It Out: Team Oral Exams in a Capstone Leadership Course

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In higher education, there is increased pressure to employ teaching and learning methods that mimic real world contexts, especially for students pursuing STEM careers. Research from the field of engineering education suggests that team-based oral exams serve as a more effective tool than traditional testing methods to evaluate students' learning. In that vein, seniors studying agricultural leadership education at a large, public, research university take a required course called Collaborative Leadership. As a practical capstone to their leadership studies, students work in teams to identify and to address adaptive social challenges in the community alongside professional partners from organizations and industry. Most assignments in the course are performance-based and require students to produce practical tools. Because the course is grounded in several theoretical concepts, students are also evaluated on their understanding of conceptual frameworks and their ability to apply concepts to their lived experience. Since students work in a team context all semester, it seems appropriate to evaluate their theoretical learning by using a social process. Near the end of the semester, each team gets a designated time to sit for an instructor-facilitated oral exam lasting 20 minutes. Teams are scored on accuracy of their applied responses and on distribution of responses among teammates. Exam questions are customized to each team and sessions are video recorded. In written reflections, students report a positive experience with this form of assessment, a deeper understanding of concepts, and an appreciation the opportunity to support one another in an examination process.

044

Oral

Factors Influencing Students' Choice to Major in Agriculture

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A shortage of skilled workers graduating from American universities means many agricultural jobs are filled by individuals not trained in agriculture. Utilizing the Model of Career Choice as the theoretical lens, the research objective was to describe the behaviors and factors influencing students in choosing a major in agriculture. An online survey was distributed to a random sample of college students within the college of agriculture. Of the respondents (n = 284), 47% had changed their major at least once prior to their current major and 42% had changed their major from a different college. Almost half of the respondents decided on their college major while in college. Participants overwhelmingly felt their major was preparing them for their future career (97%) and were confident in their ability to secure a job after graduation (94%). The socializers and past experiences most influential in the students' decision to major in agriculture were high school career and technical education courses (56%), high school science courses (56%), and parents (53%). Prior work experience (71% agree) and internships/job placements (52%) were influential as well. Most participants chose a major based on their own perceived talents (94%) but also on the number of job opportunities available (71%), advancement opportunities (63%), and income opportunities (59%). Findings suggest student recruitment efforts should continue well into the students' college career. Additionally, recruitment efforts should consider the important influence of high school coursework in students' decisions. These findings can help in efforts to secure well-trained professionals in agriculture.

045

Oral

Cooperating Teacher Needs: A Delphi Study of Agriscience Teachers in Florida

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A substantial amount of research focuses on the importance of cooperating teachers (i.e. seasoned and proficient teachers who transmits knowledge to a pre-service teacher through demonstration, conversation, and coaching) and the impact that they have on the careers of pre-service and early career teachers. Unfortunately, cooperating teachers typically lack the preparation to serve as mentors for student teachers with limited research to focus on this need. To address this need, we used a three-round Delphi study approach to identify training and support priorities for cooperating teachers. We created a panel of 22 cooperating teachers that hosted student teachers between 2016 and 2018. The Delphi technique was used to develop consensus on the priorities for providing beneficial support and/or preparation based on the panel's experience with a student teacher(s)/intern(s). We develop an a priori definition of consensus to be 2/3 of the panelists selecting strongly agree or agree related to need of each type of training and support to improve their cooperating teacher efficacy. Following the third round, the panel achieved consensus on 6 items: examples/explanations of forms and reports from the student teaching handbook; copies of program lesson plan templates; meetings with the intern prior to the start of the internship, including learning about strengths/abilities; a Cooperating Teacher Workshop; and early communication for the cooperating teacher and the intern. These items directly informed the training and support of cooperating teachers in agricultural education programs in Florida and can be used as a framework to guide similar efforts across the country.

046

Oral

Making Food Policy Relevant: An Innovative Approach

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The adage “learning by doing” is more prevalent in today’s world of education than ever before. Research exists showing that students build new ideas and concepts through active participation in real life experiences or situations better than through traditional classroom settings. Building upon this foundation, a personalized, student-centered experience was developed and implemented as part of a “Local Foods and Food Policy” course. This presentation will show how students assumed the role of an elected official to address food policy related issues and put research into practice. To develop a deeper understanding of issues, students interacted with current stakeholders, engaged with professors from outside departments, interviewed current elected officials, participated in educational tours and completed service-learning hours. Through these activities, students gained firsthand knowledge of how policies affect different aspects of the food system. The final project required students to draft a legislative bill and present it to an audience, including a food policy maker, to express personal feelings and provide possible solutions to food related issues. Based on post-course student interviews, evaluations, and formal reflections, most of the students felt they were more empowered to take action to help establish, change or enforce food policies affecting them. Initial instructor concerns with this approach included; uninterested students and students not willing to discuss personal food issues affecting them. Future changes to this approach include; increasing the number of individual interactions with policy makers and food policy interviews with consumers throughout the duration of the course.

047

Oral

Preliminary Analysis of Career Preparation through PFL/SAE-based Agricultural Instruction

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While effective career preparation is a key objective of secondary agricultural education, little consensus exists as to how to most effectively achieve this goal. Classroom-based instruction that emphasizes “preparation for future learning” and “trajectories towards expertise” combined with career-specific supervised agricultural experiences (SAE’s) may result in maximal career preparation. As part of a pilot study intended to assess design-based research for agricultural instruction, an experimental natural resources curriculum was developed and implemented at a rural Michigan high school during the 2018-2019 school year. A total of 62 students took part in the curriculum, which emphasized scientific literacy, model development, quantitative analysis, and the adoption of sustainable knowledge and practice in agriculture. This classroom component was paired with an out-of-class requirement for SAE’s that emphasized situated learning and preparation for specific careers. Results were assessed using qualitative interviews of the instructor and focus students, video-recorded classroom observations, pre- and post-instruction assessments, and student classwork. While the PFL-based classroom instruction broadened students’ long-term preparation for careers, the out-of-class SAE component had mixed results due to the initial difficulty of finding suitable opportunities for all students within a limited timeframe. However, the explicit connection of situated learning to classroom instruction showed strong potential for increasing student motivation and enabling greater career preparation. These findings will be used to expand and guide the ongoing development and testing of this instructional model during the 2019-2020 school year, the results of which could be used to improve the effectiveness of secondary and post-secondary career instruction.

048

Oral

The Rookie: Describing A Researcher’s First Semester Teaching in a University Classroom

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Mississippi State University, Starkville, MS

Research faculty often find themselves teaching classes with little knowledge of effective teaching methods. The purpose of this phenomenological study was to describe the teaching experience for a faculty member with a research appointment and no formal teacher training. During this experiment, the instructor and students kept weekly journals reflecting on their teaching and learning experiences. After analyzing the instructor’s journal individually, we met as a team and agreed on four themes. Those themes were

compared with the students' journals (N = 35) to provide a well-rounded view of the class experience. The themes identified included confidence in teaching ability and knowledge of topic, dedication to providing a quality learning experience, planning and time commitment, and building rapport with students. Regarding themes one and four, the instructor experienced frustration with teaching methods and student engagement. In addition, the amount of time it took to prepare for class each week made the instructor feel like they were neglecting their other responsibilities as a researcher (theme three), resulting in short-changing the students who enrolled in the course (theme two). The students' frustrations mirrored the instructor's; however, on several occasions' positive student remarks about the instructor's personable approach to teaching contradicted the instructor's own self-criticism. As faculty in the agricultural education discipline, we are uniquely positioned to provide teaching support to faculty members in this position. It is recommended that researchers continue investigating the university teaching and learning experience from a novice instructor's point-of-view to best meet their professional development needs.

049

Oral

Student- Generated Educational Content in the STEM Field

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This presentation provides an in-depth demonstration of how students from different departments housed at a distance campus within the University of Florida College of Agricultural and Life Sciences worked together to create valuable learning materials for current classes, future classes and created the potential for open-source learning through a YouTube platform. Students in agricultural education and communication courses enrolled in the communication and leadership development specialization (CLD) worked with content gathered by drones which were operated by students in the geomatics concentration (GEM). Providing opportunities for students to interact with one another and with STEM technology has enhanced the learning experience for both the CLD and GEM disciplines. GEM instructors and students have provided and will continue to provide hands-on training to CLD students by teaching drone mechanics, flight patterns, drone usage, and UAS operations. In turn, CLD students have filmed and will film this learning process and use footage collected from flights to create how-to videos in UAS operations. To date, CLD students have created instructional videos that highlight the data collection and the video- to- computer upload process. These videos were uploaded to YouTube to allow for easy access. This project continues to evolve, and each student brings a unique perspective to the process. Preliminary resources generated from this project are already available and are in use by students working on independent projects. The goal is to use the educational materials in future CLD and GEM courses as part of standard curriculum.

050

Poster

Assessing Agriculture Teachers Content Knowledge and Perceptions of Plant Tissue Culture

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Michael Kane
University of Florida, Gainesville, FL

Do agriculture teachers have the content knowledge and skills to teach plant biotechnology to students? To prepare students for STEM careers in plant biotechnology and identify the critical content knowledge and skills, development of plant biotechnology educational and curriculum materials is needed. Consequently, agriculture teachers face barriers of limited time, equipment and funding as well as content knowledge training in plant biotechnology. The purpose of this research was to explore agriculture teacher content knowledge levels, attitudes and barriers toward teaching plant biotechnology through participation in a plant tissue culture training workshop. The primary objective of this study was to assess the effectiveness of three plant tissue culture modules that were suitable for use in Florida's plant biotechnology classroom. Three novel hands-on plant tissue culture modules consisting of lesson plans and laboratory exercises were presented in an eight-hour training and professional development workshop at the

University of Florida micropropagation laboratory. The teaching module design consisted of standard driven lesson plans that focus on teaching, skill performance, assessing for understanding, and transfer of learning. The assessment used a pretest and posttest experimental design to measure content knowledge gain in teachers. The results showed a significant increase (23.8%) in content knowledge gain confirming that an eight-hour training could improve teacher content knowledge in plant biotechnology. Additional opportunities for focused professional development trainings and curricula are recommended to build strong agriculture biotechnology programs and embrace the STEM career fields in agriculture.

051

Oral

Write to Learn: Using Kolb's Learning Style Inventory to Teach Agricultural Writing Courses

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Experiential learning plays a valuable role in communication and education. Kolb's theory of experiential learning—concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE)—distinguishes four learning style quadrants, including accommodating (CE/AE), diverging (CE/RO), assimilating (AC/RO), and converging (AC/AE). Because experiential learning best occurs when students actively reflect on their experiences, understanding student's learning styles is especially helpful in developmental agricultural communications writing courses. Thus, we used Kolb's Learning Style Inventory to identify students' learning styles in the intermediate and advanced agricultural writing courses in the Fall 2018 (N=75) and Spring 2019 (N 63) semesters at Texas A&M University. Students from the intermediate writing course (Fall 2018, n=57; Spring 2019, n=35) and from the advanced writing course (Fall 2018, n=18; Spring 2019, n=28) each ranked the accommodative (CE/AE) learning style as the most preferred learning style, with active experimentation as the most preferred learning mode (M=27.74; SD=4.66). Assimilative (AC/RO) was the least preferred learning style for each class, and reflective observation (RO) was the least preferred mode (M = 23.36; SD=4.33). Considering students learn best when using their preferred learning style, we recommend using additional hands-on writing exercises to target accommodative learners, such as guided reflection, interpreting case studies, and group writing prompts. Conversely, to implement a holistic learning experience, we also recommend applying Kolb's theory to the Texas A&M University agricultural writing continuum by implementing strategies targeting all learning styles.

052

Oral

Improving Multidisciplinary Instruction through Applications of Drone Technology

Amr Abd-Elrahman*, Kati Lawson and Katie Britt
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Student creativity and marketability can be improved through cross-discipline collaboration. STEM geospatial technologies, represented by drone image acquisition, play a central role in such collaboration. Companies utilize multi-disciplinary applications including mapping, videography, marketing, agricultural production and planning, and inspections. This presentation demonstrates efforts to build drone image-capturing and processing capacity by integrating Geospatial STEM skillsets and Agricultural Communication and Leadership teaching. The demand for this skillset has caused implementation of a variety of course topics in CALS curriculum including mission planning, drone use, image processing, application development and implementation, and inclusion of emerging image recording techniques into traditional video-editing courses. Access to UAS technologies has not only allowed faculty in Geomatics and Agricultural Education and Communication programs to improve instructional material but has also led to collaboration with other faculty and stakeholders in Extension, the Florida dairy industry, and in Florida Agritourism. These inter-disciplinary activities provide opportunities for undergraduate, graduate, and certificate students to work on projects and receive training as a test case for future implementation in the curriculum. Students have been involved in data collection for agriculture yield modeling, production of Extension training materials highlighting best management practices in the dairy industry, promotion of

agritourism, online video creation to serve as teaching tools for other students and developing technical skills for project design and image calibration. Resources made available through this effort have already been used by enterprising students for independent projects, and we expect this trend to continue and increase.

053

Poster

Teachers' Perceptions and Practices of Inquiry-Based Teaching and Learning Using CASE Curriculum

Bryanna Nelson*, Hui-Hui Wang and Mark Tucker
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In response to a long-standing need for change, Curriculum for Agricultural Science Education (CASE), has created a curriculum that is built on inquiry-based learning. To implement CASE curriculum, teachers must complete an intensive training taught over a ten-day period and is heavily focused on demonstrating the lessons. To understand teachers' perceptions and practices of inquiry-based teaching and learning when using CASE curriculum, a survey that was developed by using National Science Education Standards (National Research Council, 1996, 2000) as theoretical framework, was sent out to teachers certified in an introductory CASE course, Agriculture, Food and Natural Resources (AFNR), and a higher, more inquiry-based CASE course, Food Science and Safety (FSS) for comparison. Both groups of teachers (349 from AFNR and 43 from FSS) have an understanding about open inquiry, and struggle with defining and identifying structured and guided inquiry. This uncovered mixed interpretations about inquiry-based and problem-based instruction as well. Additionally, teachers were asked about how the curriculum is being used post training. Results showed that teachers frequently pick and choose lessons, remove or skip lessons, and teach the course in a semester or quarter format, which goes against CASE recommendations of a year format. Most frequently teachers cited skipping lessons because they did not have adequate materials for the lesson, or they simply did not like the lesson presented. Recommendations for the curriculum include changing the format to fit more school structures like semesters or block schedules, and a heavier focus on the curriculum framework during training.

054

Oral

Ready for the Real World?

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Sam Houston State University, Huntsville, TX

Workforce readiness of college graduates is a common concern among employers, faculty, and graduates. Agricultural Sciences at Sam Houston State University offers a required, senior level course, Professional Career Skills that is required across all majors in the department. Animal science faculty were concerned their majors were not getting appropriate guidance to be prepared to interview for positions available in the animal science industry. In the fall of 2017 (n=48) and 2018 (n=37), animal science seniors were placed in Animal Science Cohorts that were team-taught by animal science faculty. The students were required to apply for posted animal science-related positions on the course platform. To apply for the position students had to complete an application, provide a cover letter and resume, and place the materials in an addressed envelope. After the application process, each student had to participate in a telephone interview followed by a face-to-face interview, conducted by all faculty. Throughout the course, the students received formal lectures on effective letters/resumes, professional dress, dining etiquette, and benefits and retirement options. Evaluations from the students were positive, "Getting feedback from the interviews were extremely helpful", "Helped me better myself for the work force interviewing process", and "... this course is a great tool for students that will be graduating, I feel better prepared". The overwhelming positive feedback endorsed the constructive feedback, application process, and interview experience. The process better prepared animal science students and developed confidence in their interview skills and knowledge.

055

Oral

Student Success on Different Credit Attainment Pathways

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Sam Houston State University, Huntsville, TX

At Sam Houston State University, students are monitored to determine their success during their academic career. The objective of this study was to determine differences in GPA and standardized entry exams (SAT and ACT) based on how students prepared for and began their college careers. The three types of credit attainment pathways included: (a) student participation in dual credit in high school and then transferring into the 4-year public university (DC), (b) student attendance at a community college (approximately 60 hrs) and then transferring into the 4-year public (CC), and (c) first time undergraduate with no dual credits earned or no community college transfer credits (FTU). Data were collected from 11582 students at SHSU over a six-year period and included GPA (at 60 hrs, 90 hrs, and graduating GPA), SAT scores, and ACT scores. GPA and test scores were compared across DC, CC, and FTU students using the GLM procedure in SAS. Review of test scores shows that DC students had better scores ($P < 0.01$) on both the ACT and SAT with no differences detected between the FTU and CC groups. In GPA scores the DC was always higher than all other groups ($P < 0.01$). However, at 90 hrs and graduating GPA the CC group outperformed ($P < 0.01$) the FTU group. This illustrates that while dual credit is the best pathway for student success, those students who attend a 2-year junior college followed by a 4-year university will eventually outperform those students who spend 4 years at a single university.

056

Oral

Gather Around the Crock-Pot: Creating Community in Small Class Sizes

Kati Lawson*
University of Florida, Plant City, FL

Crock-Pot meals have become a staple in the communication and leadership specialization (CLD) classroom at the UF IFAS CALS @ Plant City location. Each week, students attend two in-person classes (three hours each), totaling six hours in one day. All face-to-face courses are offered on one day to allow working students flexibility with their schedules. To help students break up the time and allow for fellowship, I have instituted Crock-Pot meals so they can eat on campus in-between classes. Students sign up for meals at the beginning of the semester and choose which days they will provide lunch/dinner. Class sizes rarely exceed 10 students, so this application has worked well. Students bring in Crock-Pot meals on the days they selected, and the entire class sits down for lunch or dinner depending on the time of day the classes occur. This practice has evolved over three years and provides benefits such as community building, relationship enhancement between students and students to teacher, practical meal-planning skills, and an opportunity to design a cookbook. I use this mealtime to have informal chats with students and give them career and life advice. For a tangible token, students produce a cookbook at the end of each semester. They use their skill set to take photos of each meal, design, edit using InDesign, and ensure the document is ready for print.

057

Oral

Students' Perceived Barriers, Benefits, and International Programmatic Preferences

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University of Arkansas, Fayetteville, AR

Study abroad experiences can change college students by contributing to their development of self-awareness, communication skills, and ability to navigate the unknown. The objective of this study was to determine students' perceived barriers, benefits, and preferences for international programs (IP). Undergraduate students in large enrollment, required courses by major, and all orientation undergraduate courses in the Bumpers College of Agricultural, Food, and Life Sciences were targeted, and all grade

classifications were represented (n=672). Based on a 5-point Likert-type scale (1 = completely disagree to 5= completely agree), students reported “cost is too high” (M=3.92, SD=0.99) and being “too busy with school” (M 3.54, SD=1.07) as the greatest barriers to participating in an IP. Students reported “socially/culturally learn more about a host country” (M=4.61, SD=0.67) and “life-changing opportunity” (M=4.60, SD=0.70) as the most influencing benefits. Students were most interested in short-term, faculty-led programs (n=324, 27%) with a length of 2-3 weeks (n=224, 31%) during summer session I (n=307, 39%). Students reported they would like to learn more information about IPs through email (n=278, 35%), classroom visits (n=111, 14%), and their academic advisors (n=108, 14%). Assessing student’s barriers, benefits, and preferences for IPs will guide program development. With decreased budgets and a desire to serve students in all educational areas, it is important to focus IP efforts on students’ needs and interests.

058

Oral

So, You Want to be a Faculty Member: Preparing Doctoral Students to Lead Graduate Courses

Gladys M. Walter, Lacey Roberts and Tracy Rutherford
Texas A&M University, College Station, TX

Research and teaching are the primary areas of training for students enrolled in doctoral programs. For students who intend to matriculate into faculty positions, their future responsibilities will include teaching and mentoring graduate students. However, most of the teaching training students receive in doctoral programs is undergraduate focused. State and institutional policies limit the ability for doctoral students to teach graduate students. Therefore, two second year doctoral students were selected to assist in facilitating a required seminar in two separate spring semesters for graduate student peers. Responsibilities delegated by the tenured faculty instructor of record included creating the course syllabus, identifying and scheduling presenters, creating and reviewing assignments, and guiding discussions. To assess this innovative concept, the doctoral student facilitators engaged in a process of peer debriefing. Facilitators observed a need to differentiate ongoing friendship interactions from the expectations that came with positional authority in the classroom. Additionally, they noted more flexibility about attendance policies is needed to accommodate the dynamic life and professional responsibilities of graduate students. Students enrolled in the course expressed having graduate student facilitators created a judgement free environment for questions normally withheld from professors. Students also felt information shared was more relatable and timelier because the graduate student facilitators were recently exposed to or engaged in their experiences as graduate students. As departments continue to prepare their doctoral students for future faculty roles, we recommend replicating this immersive training experience at other institutions.

060

Oral

The Impact of International Programs on Student Motivation and Engagement in College

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Colleges aim to increase student achievement, which has been linked to motivation and engagement, and increase global partnerships. There is also an increasing demand from students for international programs (IP) that prepare them to be global citizens. This study aimed to compare student motivation for continuing college and student engagement in the classroom before and after an IP. Students who participated in a Bumpers College of Agricultural, Food, and Life Sciences IP between January 2018 and August 2018 were surveyed prior, and two weeks and three months post-program participation (n=24). The instrument had 51 Likert-scale questions and nine demographic questions. Most respondents were female (83.3%, n=20) and all grade classifications were represented. There was a decrease in emotional engagement from pre-IP (M=3.95, SD=0.70) to three-month post-IP (M=3.70, SD=0.74), a mean decrease of 0.25, 95% CI (0.24, 2.48), which was statistically significant, $p = 0.045$. There was also a decrease in skills engagement from 2-week post IP (M=4.06, SD=0.68) to 3-month post IP (M=3.88, SD=0.75), a mean decrease of 0.14, 95% CI (0.014, 3.15), which was statistically significant, $p=0.047$. No significant differences were detected for the other six motivation constructs or two engagement constructs. These data provide insight into the

impacts of IPs on student motivation and engagement. A follow-up study about students' persistence to graduate could help understand the effects of IPs on student achievement.

061

Oral

CALS Faculty Perspectives on Mentoring Underrepresented Minority Students in Research

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Virginia Tech, Blacksburg, VA

Efforts to increase diversity in colleges of agriculture (CALs) at 1862 Land Grants are underway nationally. Undergraduate research, which often includes developing strong, reciprocal partnerships between students and faculty, can have positive impacts on underrepresented minority (URM) student persistence, confidence, and professional socialization. 1862s, however, are predominantly white institutions and majority (white) faculty in CALs were often trained at similar institutions. Our study aimed to understand experiences of faculty members in a CALs when working with URM students in their research groups. From a sociocultural theoretical lens, the practice of working with URM students is an opportunity for faculty learning about how to meet the needs of these students. Participants in this qualitative study were a purposeful sample of experienced faculty. We developed an open-ended interview guide using an a priori table constructed from an extensive review of pertinent literature. We conducted six 30-60-minute audio-recorded interviews and analyzed them following the constant comparative method. Findings include recommendations for working with URM laboratory students: establishing time and structure for one-on-one meetings, building relationships with all students, and treating all students equally to ensure there are no distinguishing differences between student groups. Additionally, our analysis revealed areas of potential need for continued professional education (CPE). Few study participants take time to learn about the cultures of students who might have backgrounds different from theirs or encourage URM students to have multiple mentors. Our findings provide guidance for design of faculty CPE and undergraduate research programs serving URM students in CALs.

062

Oral

Making Sense of the Buzz: A Systematic Review of “STEM” in AFNR Education Literature

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Hui-Hui Wang
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The world demands individuals with knowledge and skills in agriculture, food, and natural resources (AFNR) paired with proficiency in science, technology, engineering, and mathematics (STEM) concepts. Current models for STEM education call for interdisciplinary approaches in which learners address real-world challenges, indicating high potential for collaboration with researchers and practitioners in AFNR. The purpose of this study was to articulate the state of the 2010-2017 literature for STEM in AFNR education to inform future research, innovations in practice, and interdisciplinary collaborations. Using a systematic review approach and qualitative analysis techniques, 52 peer-reviewed STEM in AFNR education articles were analyzed for general characteristics, instructional approaches, STEM subjects, relationship between STEM subjects, relationship between STEM and AFNR, justifications, foci, and operationalization of STEM in research. Results indicated STEM in AFNR serves a range of populations. Science and math are well represented, engineering is poorly represented, and mechanisms through which STEM learning occurs are often inadequately described. Emergent themes were also identified that resulted in a summary of STEM

in AFNR education. For example, the relationship between AFNR and STEM was represented in three different ways: AFNR education is an appropriate context for STEM learning, STEM learning happens naturally as students engage in AFNR education, and STEM learning outcomes can be incorporated into AFNR education. Using our findings as a guide to build upon previous work, we recommend intentional planning for how and why STEM is being connected to AFNR in educational settings.

063

Oral

Assessing Intercultural Competencies with Video and Written Reflection of International Service Learning

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The objectives of this presentation are to define intercultural competencies as learning objectives and share qualitative assessments with rubrics. Most of us most comfortable teaching and assessing agricultural science content, yet employers demand affective competencies as well as discipline content. Many authors have identified the ability to work in intercultural teams as critical employability skills. The learning goals of these International Engagement Methods courses include “Develop undergraduate intercultural competencies of communications, empathy, and self-awareness”. This service-learning approach applies principles of extension methodology and community development to present an Agri-Symposium to university students in Cap Haitien, Haiti. We have used partner relationships since 2011 to enable U.S. and Haitian student teams to address identified challenges related to food security and entrepreneurship. To assess the learning objective “demonstrate intercultural knowledge and effectiveness to successfully communicate, understand, and interact among people with differing assumptions that exist because of ethnic and cultural differences” we used three different assessments. Daily reflection journals, Intercultural Attitudes, Skills and Knowledge Short Scale PLUS, and a three-minute individual reflective video are expected. Using the intercultural learning objective, these learning outcomes were coded using NVIVOR. Reflections were assessed using competencies of Knowledge (cultural self-awareness and cultural worldview frameworks); Skills (empathy, and verbal and nonverbal communication); and Attitudes (curiosity and openness). Qualitative methods reveal that student reflections show growth in cultural self-awareness, empathy, and verbal and nonverbal communication. All students stated that the experience broadened their knowledge of a range of cultures and understanding of human values and diverse worldviews.

064

Oral

Implementing the Morningside College Garden: An Innovative Approach to Empowering Student Learning

Thomas H. Paulsen
Morningside College, Sioux City, IA

The value of student empowerment in higher education has been supported in numerous disciplines. Recent literature supports students’ preference for flexibility and choice in their educational experiences. This presentation describes how a student-developed solution to several misperceived agricultural and food-based issues researched in an agriculture and food history course emerged in the form of a learner-centered, college garden. As the final project in the course, students developed a narrative following USDA/AFRI Food Challenge Grant requirements and aligned with the Morningside College mission statement. Five of seven student groups independently focused their narrative upon developing a college garden. With this foundation, the course instructor wrote and received a \$10,000 match grant from a statewide health insurance foundation, which funded the startup of the Morningside College garden. A one-acre garden with in-ground and raised beds was constructed on campus. Additionally, students established a co-curricular, interdisciplinary club and secured additional financial resources through student government. The garden provided supplementary campus facilities for agricultural laboratory spaces, student outreach activities, and service-learning opportunities for students from ten different majors across campus. Students were empowered to make decisions through agricultural course lab activities, independent study research projects, and through paid and unpaid garden-related internships. Students

collaborated with the campus food service coordinator and the executive chef to develop food safety protocols and market over 2000 pounds of local food served in the cafeteria. Course reflections and co-curricular participation interviews support students' appreciation for empowerment in the establishment, operation, and future planning of the garden.

065

Poster

Teachers' Supports and Hindrances in Implementing STEM Integration through AFNR Context

Mingla Charoenmuang, Hui-Hui Wang, Neil A. Knobloch and Roger Tormoehlen
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This study addressed a concern of limited teachers operationalizing STEM integration and the need to incorporate agriculture, food, and natural resources (AFNR) as the context. Two teams of teachers from various disciplines and teaching experiences implemented STEM integration using hydroponics systems. The researchers used Bronfenbrenner's ecological model to identify supports and hindrances the teachers experienced during implementation. School One was in a small city with an enrollment of 2,000 high school students. The team had two biology teachers, one chemistry/physics teacher, and one agriculture teacher. Their designed lesson plans were suitable for a student's high school career. School Two was in a rural community with an enrollment of 500 junior-senior high school students. The team had two biology teachers, one agriculture teacher, and one mathematics teacher. The teachers implemented an afterschool program. Internal supports and hindrances were generally similar for the two schools. Teachers were interested and recognized the values of STEM integration through AFNR for instructions and career opportunities. Teachers expressed concerns regarding insufficient knowledge in hydroponics and other disciplines they did not teach. External supports and hindrances were different between the two schools. School One was more flexible in using academic standards which permitted the incorporation of hydroponics systems in class while School Two could not because their focus was on increasing students' state test scores. In conclusion, the study found that confidence in knowledge, how a teacher defined STEM integration, school culture, administration support, and state tests affected each team's teaching approaches and lesson plans.

066

Poster

Combining Experiential and Service Learning in Agriculture Research

Wesley Gwaltney
Virginia Tech, Blacksburg, VA

The subject matter of agriculture lends itself readily to the implementation of both experiential and service learning and the Agriculture Technology Program (AT) utilizes these practices in many of our upper level courses. The objective of this project is to make undergraduate research, experiential, and service-learning opportunities available to our associate degree track students. For the past three years, two AT students have received Pratt Undergraduate Research Scholarships for research conducted at the Giles County Land Lab (GCLL). The work that AT is involved in at the GCLL, offers faculty an opportunity to marry experiential and service learning for our students. The mission of the GLCC is to provide learning experiences for K-12 students in Giles County, VA. K-12 students learn about agriculture, environmental science, math, engineering, and humanities through lessons facilitated in a farm setting. The Pratt recipients work directly with high school agriculture teachers and students to implement AT research. The AT students' research concerns methods of improving forage quality, decreasing the need for stored feeds, improving herd health, and reducing erosion potential on the grazing portion of the GCLL. Through their experiential and service learning at the GLCC, AT students have gained a more comprehensive understanding of intensive grazing and conservation practices while also being a service to the GLCC and its users. This poster outlines the work our students have done over the past three projects and offers insights to the impact it has had on our students as well as the high schoolers they have worked with.

Developing Study Skills with Veterinary Medicine Students: A Mixed-Methods Study

Chris L. Chapman, Heloisa M. Rutigliano and Carly Thornhill
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The first year of veterinary school presents an intense jump in difficulty for most students coming in from their undergraduate studies. They often struggle to adjust to the increased pace of learning, the class load, and the sheer amount of information they need to master in order to perform well in their classes. Many students compare the experience to “drinking water from a fire hose.” Students who struggle in the first semester of their studies tend to have poorer outcomes academically and are more likely to have to leave the program. The researchers developed a Study Skills Seminar based on the latest research on learning, memory, and effective study methods. We administered an assessment of student study habits, presented the seminar, and then followed up with an updated assessment of study habits at the end of their first semester. We hoped to answer questions to assess the effectiveness of the Study Skills Seminar in encouraging students to adjust their study methods and how their study skills evolved over time. We found that students over the semester studied less in terms of hours but switched from less effective methods (reviewing the textbook, passively reading through notes) to more effective methods (effortful recall, self-testing) as the semester wore on. Students credited experience, collaboration, and the Study Skills Seminar for helping them switch to more effective methods over time. Students reported the Study Skills Seminar provided valuable tips and provided suggestions on how to reinforce lessons from the seminar throughout the semester.

068

Oral

The Game of Farm Life - An Inquiry Project for Introductory Animal Science Students

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An inquiry-based project “The Game of Farm Life” was presented to 112 students in an introductory animal science class to provide an open-ended opportunity for student learning. The objective of the project was to have groups of 12 to 13 students become fluent in animal agriculture by starting up a farm for one of nine commodities (dairy, broiler breeders, layers, turkeys, broilers, beef - cow calf, beef feedlot, swine and sheep). Students were instructed to demonstrate a knowledge of farm development requirements, animal breeding, nutrition, housing, health etc. Each group of students was introduced to a farmer from that commodity who served as mentor for the project. Students were given \$10,000,000 (fake cash) to use in to buy land, build barns, perhaps buy quota, buy breeding stock, insurance, permits etc. Each group elected a farm manager while the other students prepared job descriptions for their area of specialization (nutrition, breeding, equipment, housing, health etc.). Ten weeks later, at the completion of the term, each group of students was provided with a tabletop and a poster board to present their farm operation to the public in an evening forum for 350 people. The deliverables included a graphic representation of farm (2D or 3D), descriptions of size of farm (animals, land etc.). Overall student responses were very positive, and a high level of creativity was apparent in each group. The project is being enhanced in 2019 with a live auction to sell the farms.

069

Oral

Developing Workforce Relationships and Partners in Education: A Model

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Sam Houston State University, Huntsville, TX

Texas Workforce Commission provides current and projected analyses for employment demand and gap analysis for specific occupations and industries. Demand and gap data range from large negative numbers, indicating a saturated market, to large and seemingly unachievable numbers, signifying a deficient

workforce. Companies within the region of Sam Houston State University (SHSU) are realizing two workforce gaps, employees 22-32 years of age and mid-age employees. Industry concern focuses on the gap created with the promotion of mid-management personnel replacing vacancies from “baby-boomer” retirement. To address these demands and assist in closing the gaps, SHSU actively develops workforce partnerships with well-established, principal companies. The education/industry partnership is multi-facet with two primary objectives: deliver internship and employment opportunities to students and establish pipelines of workforce prepared graduates to companies. Representatives from collaborating companies enrich the learning environment as guest speakers, while, providing specialized tools/equipment for experiential learning in the laboratory. These activities, brand company identification, mission, scope, and career opportunities with students. Faculty willingly imbed specific learning outcomes within pertinent courses and program curriculum to ensure specific skillsets are attained when the students reach upper-level courses and prepare for internships. These imbedded outcomes strengthen the internship experience and shorten the “new-employee” training period when hired. With strategic public and private commitments to meeting workforce needs, SHSU excels in employment rate for graduates within 12-months of graduation. Cooperative environments between faculty and industry has developed organized internship opportunities for students while providing pipelines of workforce ready and prepared graduates, fulfilling labor force gaps.

070

Oral

Combining Veterinary Science and Business Through Team Teaching of a Course

Clint Ary, Joey Mehlhorn and Jason Roberts
University of Tennessee, Martin, TN

Veterinary science and veterinary technology are often among the most popular options in agriculture undergraduate degree programs. The strength of most programs lies in delivering technical knowledge, but many students have a hard time relating those skills to the realities of the profession. Managing staff, customer service, accounting and billing of services are routinely cited as areas of improvement for new veterinary technology graduates. This reveals a need for students to develop business and soft skills in the context of the veterinary environment. Previously, students took traditional business courses which lacked real-world veterinary business examples. As expected, most students left these courses thinking that the material was not helpful to their career. A new interdisciplinary course combining business and veterinary technology was developed and taught as a beta test during fall 2018 to 35 students. Veterinary science and agribusiness faculty worked to develop, and team teach a senior level veterinary management course, initially to be delivered online. Student and faculty feedback were mixed. Students did report increased understanding of the importance of business skill requirements in their future jobs and they preferred the course to traditional business courses. Faculty noted that the online nature of the course provided flexibility in developing self-contained modules. In the future, the course will be available to the veterinary science students and is being considered as a business elective for other agriculture majors. The experience has been positive and serves as a model on how to approach subject matter in a more engaging multi-dimensional fashion.

071

Oral

Adding Drama to the Classroom: Utilizing Dramaturgical Teaching to Engage Students

Jason Headrick and Kate McCain
University of Nebraska, Lincoln, NE

Dramaturgical teaching is an innovative pedagogical approach to teaching undergraduate classes. This pedagogy is linked directly with simulation and role-play methodologies. The approach has roots in theatre and the performing arts and can allow the instructor to embody a concept, character, theory, leadership style, or an application from classroom discussion. This teaching style is described as a student-centric approach to delivering content. Course evaluation data has supported overall student satisfaction (i.e. attitude, method of instruction, interest and attention). Dramaturgical teaching is an innovative teaching pedagogy for leadership courses. The presenters will share best practices for execution, give specific

examples, and share the experience of both instructor and students derived from a dramaturgically taught leadership course. Research conducted in agricultural leadership classrooms on simulation teaching has shown a connection to theory and practice, meaning making, and the development of critical thinking and increased interaction with peers. This pedagogy translates well to the social sciences. It challenges students in leadership courses to make connections among content and engages them in critical thinking in the classroom and beyond.

072

Oral

Using Continuous Monitoring Technology to Improve Cattle Production Success

Kimberly Inman, Clint Ary, Will Bird, Jason Roberts and Joey Mehlhorn
University of Tennessee, Martin, TN

According to the National Agricultural Statistics (NASS) and the United States Department of Agriculture (USDA) there is a combined total of approximately 500,000 cow and calf deaths every year during calving. Studies indicate that dystocia, or difficult birth, is responsible for over 33% of all calf losses. There are many variables that can be managed to decrease mortality. One of these is adequately influencing the associated genetic factors using expected progeny differences (EPDs). Another is producer awareness of cattle behavior during birthing and appropriate response to dystocia. Finally, the use of technology such as on-farm devices marketed for automated calving detection and video monitoring can improve producer response time during this critical period. With the technology, especially wireless, the video feeds can be viewed from computers, smartphones, and electronic tablets. An example of a negative aspect of video surveillance to detect dystocia and impending labor is loss of internet. Cattle loss due to dystocia impacts the operation financially through reduced number of marketable cattle as well as reducing the availability of replacement bulls or heifers. A survey completed by producers determined advanced training and video technology significantly reduced herd mortality. This is believed to be due to improved understanding of when and how to assist an animal and the convenience of remote video monitoring.

073

Poster

Implementation Year Impact of the Morningside College Garden through an Outcomes Framework

Thomas H. Paulsen
Morningside College, Sioux City, IA

School gardens and associated educational programs have been shown to exhibit numerous educational benefits. While recent research supports school gardens' specific connections to Science, Technology, Engineering, and Mathematics (STEM) related content, positive impacts upon personal and moral development, environmental attitude, and an increased level of food literacy and health eating habits have also been reported. The purpose of this presentation is to share the impact of the Morningside garden on students' attainment of eighteen immediate, research-based outcomes. A census of students who participated in garden-based curriculum or co-curricular activities in the implementation year were surveyed using a six-point scaled response via an online, electronic questionnaire. Student mean scores on 16 of the 18 measured immediate garden outcomes ranged between 4.01 and 4.62 on a 6.0 agreement scale. Highest rated items indicated that students increased their appreciation of the value of the local food system, understood the value of a garden, and understood the connection of the garden to other disciplines. Eighty-two percent of respondents indicated their interest in participating in future activities of the garden. The most commonly identified activities included designing the garden layout, designing and implementing a compost structure, develop a risk management assessment for the garden, designing and installing a storage shed, and design and maintain a pollinator bed. Initial student response to the implementation of the Morningside College garden supports continued engagement in numerous curricular and co-curricular activities. Continuous use of intermediate and long-term, research-based school garden outcomes is recommended to guide future programming.

074

Oral

Invigorate the Undergraduate Teaching Assistant Experience

Monika W. Oli and Amanda E. Ojeda
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Inquiry-based laboratory curricula employing active learning strategies have proven to enhance deep learning, learner-centeredness, and critical thinking. However, it demands a very different teaching strategy and more one-on-one engagement between the students and the instructors. Per semester, we offer ~25 lab sections, made of 36 students each, to over 40 majors on campus which demands considerable student-instructor ratio (~ 6:1) and adaptability to meet the needs of different students' backgrounds and educational pursuits. In order to effectively teach these modern, cutting-edge microbiology labs, we have established "Teaching Teams", consisting of graduate teaching assistants (GTAs), undergraduate teaching assistants (UTAs), and lab management. To formalize this approach, we have developed a curriculum that further enhances the UTA's experiences by training them in scientific and professional competencies, familiarizing them with the use of instrumentation and advanced technology, helping them develop interpersonal skills, and enhancing their teaching aptitude through classroom experience and online modules. The culmination of the semester is the creation of an ePortfolio with a personal reflection on their teaching experience. UTA contribution to the teaching team heightens the students' laboratory experience by providing individualized support throughout the learning process and creates a more nurturing atmosphere. This multidimensional teaching experience positively impacts the UTA's future profession through the development of lifelong skills not obtained in a traditional student role. Our UTA opportunity makes students more empowered and competitive for STEM graduate and professional degree applications.

075

Poster

Increasing Student Engagement in Social Justice Courses

Tamara Lipsa, Shalyse Iseminger and Pamala Morris
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Purdue's Communicating across Cultures (CaC) course is one that introduces the field of social justice and diversity to students in the college of Agriculture. The experience is meant to be one that challenges perceptions while providing students with the information and tools necessary to transition into the multicultural and increasingly global workspace. There is a body of research describing student resistance to social justice and diversity courses., The objective of this study is to better understand students' perceptions of the course material. Our goal is to answer the question: What can we change to increase the engagement of the students who enter the course disinterested? Participants in this study will include the 120 students enrolled in the course during the spring 2018 semester. Data are collected through anonymous surveys and focus groups after students have completed half of the semester. Application of our findings include improvement of the course materials and pedagogy. Broader implications of our findings will help practitioners improve pedagogical techniques for engaging students in affectively challenging course work. This study is significant because as the field of agriculture becomes increasingly diverse and as our society becomes more polarized, students need to be equipped to effectively work across differences. Courses such as CaC aid in student development of such skills. The findings from this study can be applied to improve such courses.

076

Oral

Self-Study of a Project-Based Graduate Course Focused on Electronic Field Trip Development

Jamie Loizzo, Peyton Beattie, Kevin Kent and Teresa Suits
University of Florida, Gainesville, FL

An opportunity exists to examine and re-construct graduate-level science communication courses to incorporate project-based learning (PjBL) for development and practice of multimedia skills, research immersion, and Extension engagement. The purpose of this self-study was to intentionally examine a newly transformed graduate PjBL science communication course with electronic field trip (EFT) design, implementation, and evaluation as the focus for integration of learning concepts in informal science education, multimedia technology, and environmental issues. Graduate students in the course worked with university museum mammologists to create, deliver, and evaluate an EFT for middle and high school students about bats, wildlife empathy, and climate change research. The presenters of this session instructed and participated in the course, as well as examined graduate student (n=8) and scientist (n=3) experiences. Multiple data sources were collected and triangulated including student interviews, an overall focus group, and course artifacts, including the EFT itself. The data collected from the interviews and focus groups were transcribed verbatim then coded using open coding methods, followed by axial coding, and member checking. Preliminary results indicated the graduate students viewed their implementation of the EFT as a success, with room for improvement to include more scaffolded assignments and time to further develop and foster confidence in new video skills. Scientists also appeared to value the experience and recommended further enhancing student-scientist interaction, clarification of scientists' time commitments, roles, and on-camera engagement, and expansion of the course to include a follow-up study abroad for additional EFTs from off-campus field sites.

077

Poster

Teaching and Learning with Technology

Monika Oli and Madan Oli
University of Florida, Gainesville, FL

The expectation of employers is changing rapidly. Especially in STEM fields, skills that were valued until recently are outdated fast and replaced by new skills and technologies. Teaching faculty and academic administrators should emphasize hands-on teaching of current skills and novel technologies students will need to be successful in the real world. This includes quantitative/ analytical skills, computational proficiencies and writing skills, as well as effective use of new or emerging technologies. Furthermore, technological tools can also be effective in communicating difficult ideas and concepts (e.g., quantitative courses in life sciences), and engaging students inside and outside of the classroom. The goal of the presentation is to explore interactively with the audience teaching approaches and a variety of technological tools that can be effective in: (1) preparing students for their future careers; (2) teaching quantitative courses; and (3) engaging students both inside and outside of the classroom. This poster encourages instructors to discuss, share and explore technologies that can be important for students to know and interesting for peers to share. Advancement of instructor's skills enhances teaching excellence and has demonstrated benefits for student's use of technology, personalized learning, enriched creativity and critical thinking.

080

Oral

Using Pedagogical Content Knowledge as a Tool for Lesson Development

Josh Stewart, Kellie Clafin, Becky Haddad and Kelsey Knight
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Content Representation, also known as CoRe, is a template created for research on pedagogical content knowledge and has been used as a data collection tool to help teachers identify and discuss conceptual knowledge of content and discuss their own teaching practice. We utilized the CoRe template in a teacher education course, as well as a preservice teacher seminar, to help agriculture teacher candidates explore ways to break down content for student understanding. Initially, we were searching for evidence of pedagogical content knowledge (PCK), the intersection of pedagogy and content. PCK is explicit and purposeful, documented by the design of and reflection on instruction. Evidence for PCK can be found in instructional lesson plans and the way teachers talk about decisions they made in planning, considered reflection-on-action. Cooper, Loughran, and Berry grounded their research on PCK on the assumption that

PCK is developed over time and continues to grow and develop through particular kinds of experiences. Results from our experiences indicate the CoRe framework can challenge teachers' thinking and provide evidence of PCK. The CoRe template also provides an additional, very practical, tool for developing lessons by offering teachers the opportunity to think about their own experiences learning particular content, realizing concepts that may be challenging for students, and thinking about the specific context of their own learning environments and their specific students. We recommend the CoRe template be used by instructors at any level to improve lesson development and student learning.

081

Poster

From eCollege to Desire-to-Learn: A Sample of Student and Teacher Experiences

Jose A. Lopez
Texas A&M University, Commerce, TX

This presentation summarizes the experiences and opinions of a sample of students and teachers from the College of Agricultural Sciences and Natural Resources at Texas A&M University-Commerce as they transitioned from Pearson Learning Studio (also called eCollege) to Desire to Learn (abbreviated D2L). The general objective of this presentation is to serve as a venue for sharing and discussing opinions and experiences about learning management systems (LMS). The specific objectives are to summarize and describe the plan/strategy that was used to transition into a new LMS; to document the challenges faced including each system's pros and cons; to identify qualities/characteristics for selecting a new LMS; and to provide the basics for assisting other universities in making similar decisions. After about 8 years of eCollege, A&M-Commerce initiated a search for a new learning management system, which led to the implementation of D2L in Fall 2018. A sample of faculty and students who went through both LMS were surveyed for their opinions and experiences. Our preliminary results indicate that eCollege is perceived to be more user friendly while D2L stands out for its many features and capabilities. In general, D2L requires users to click more to perform essential activities such as sending an email to the class. There are also features in D2L that are unlikely to be used, such as dropping the highest grade; and D2L can also be time consuming when grading assignments due to the use of two scroll bars. Although there is a learning curve associated with mastering the new LMS; in general, D2L is performing up to par.

082

Oral

Implementation and Effectiveness of an Animal Sciences Transfer Student Orientation Course at North Dakota State and Iowa State Universities

Loren L. Baranko
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A first-year orientation course is an important component of many college curriculums and these courses are typically developed for freshmen students. However, the rise in education costs and changing needs of students has led to an increased number of transfer students at four-year universities. Oftentimes, these transfer students are either placed into a freshmen orientation course or are exempt from taking the course altogether. Animal Sciences faculty at Iowa State University (ISU) and North Dakota State University (NDSU) recognized a need for additional resources for their transfer students and thus created an orientation course specifically for transfer students at their respective institutions for the fall 2018 semester. Transfer shock has been shown to negatively affect a student's transition to a new school and 83% of ISU (n=34) and 63% of NDSU (n=8) students reported being impacted. When students were asked if the new transfer orientation course aided in their transition, 73.5% of students at ISU and 87.5% of students at NDSU either slightly or strongly agreed. Most students said they would recommend the class to future transfer students (ISU 79%; NDSU 87.5%). Students at ISU reported the most beneficial topics were developing a 2-year plan, course substitutions and degree audits, resumes and cover letters, and finances while NDSU students listed clubs, resumes, and pre-vet requirements. The overall positive response to the

courses at both ISU and NDSU has led to continued curriculum development and hope for future collaboration with other institutions interested in transfer student success.

083

Poster

Trimmed Mean: A Better Tool to Estimate Instructor Performance with IDEA Evaluations

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Instruments such as IDEA evaluations are commonly used to quantify teaching effectiveness and are a significant component of tenure and merit decisions. Several universities use the responses to the prompt “Overall, I rate this instructor an excellent teacher” as an estimate of instructor performance. However, some students may provide very low or very high scores for an instructor for reasons other than the teaching effectiveness. Both these situations can bias instructors’ teaching score by reducing scores of good teachers and inflating scores of bad teachers. Therefore, the objective of this study is to determine if a trimmed mean that removes the top and bottom 10% of responses and calculates the mean of the remaining values can provide a better estimate of an instructor’s teaching effectiveness. Student evaluations were collected from courses taught at Sam Houston State University over a 5-year period (n=4,913) and both raw and trimmed means were calculated. The trimmed method increased scores of the top half of instructors by 0.15 points while the bottom half of instructors only increased by 0.09 points. When broken into quartiles, the trimmed method improved scores instructors in the first, second, third, and fourth quartiles by 0.15, 0.15, 0.14, and 0.04 points, respectively. Moreover, trimmed means continued to show strong positive correlations to questions previously identified as having strong relationship with teaching effectiveness. These results illustrate that the trimmed method does cause greater separation between the top and bottom tier instructors and may be a better indicator of actual teaching effectiveness.

084

Oral

Connecting to STEM: Project-Based Learning at a Non-Land Grant University in Collaboration with a Land-Grant University?

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Technological innovations are transforming U.S. agriculture. Hands-on learning of these modern, cutting edge technologies are essential for students of agriculture who are future producers, managers, leaders, and policy makers. But many non-land-grant universities have limited capacity for conducting field experiments, especially when those experiments involve advanced instrumentation and advanced crop techniques. Capitalizing on physical resources available at a land-grant university, students (human resources) at a non-land-grant university used elements of both team-based learning and project-based learning while enrolled in a directed studies course. A research and educational project funded by the USDA’s National Institute of Food and Agriculture provided the basis for the experiments to be studied. Field experiments with advanced instrumentation were conducted at the land grant university. Six teams (one team each fall and spring semester, from 2016-2018) of four students at a non-land-grant university visited the research fields and learned about instrumentation and data collection. The teams met weekly with instructors to discuss the project, which helped them better comprehend the research process and to understand the project in its entirety. They analyzed field data and developed research posters. Three student posters won awards in 2017 and 2018 at the Agriculture Consortium of Texas Undergraduate Research Poster Competition. The project not only helped the students understand modern agriculture and instrumentation, but also generated interest in research, as evident by one student continuing her education through graduate studies at another university. This approach may be beneficial for other non-land-grant universities that lack advanced research capabilities.

085

Oral

Learning Modules Focused on Learner-Centered, Knowledge-Centered, Assessment-Centered, and Community-Centered Environments

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Approximately 40% of the agriculture-related employment opportunities in the United States go unfilled each year. Students studying the natural sciences often do not view agriculture careers as attractive career choices. The purpose of this USDA-NIFA-PD-STEP project was to create and evaluate a Science and Agriculture Academy (SAA), which consists of a community of high school science and agriculture teachers who receive two years of professional development and instructional support aimed toward increased awareness of the multidisciplinary nature of agriculture and the related degree and career opportunities in the food, agricultural, natural resource, and human sciences. In order to prepare teachers to develop curricular materials based on the learner-centered, knowledge-centered, assessment-centered, and community-centered learning environments, 12 online modules were developed on the following topics: constructivism, culturally responsive teaching and Vygotsky's zone of proximal development, principles and instructional implications of constructivist design, teaching for depth and progressive formalization, conceptualizing and generalizing, core disciplinary ideas of science, congruency in assessment and learning, designing and conducting meaningful formative assessment, designing and conducting meaningful summative assessment, classroom and school communities, and connecting school and the broader community. Participants will use the teaching and learning concepts from the modules to work with another participant to develop curricular materials that are aligned with the disciplinary core ideas of the Next Generation Science Standards and to effectively teach both agriculture and natural science students. The development and incorporation of the curricula materials will aid teachers and students in connecting the natural sciences and social issues with agriculture.

086

Poster

A Descriptive Study of First Year Student Thriving within a STEM Program

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The academic success, persistence, and retention of students on college campuses is an area of ongoing concern for those in higher education, and particularly in STEM. A crucial period within the college experience for determining whether a student will persist in their educational experience occurs within their first year, making higher education personnel critically examine the first-year experience, especially for historically vulnerable populations. Retention is an area of programmatic concern for the STEM program assessed, and researchers sought to examine the current thriving level of first-year students. Researchers administered The Thriving Quotient™ (validated and reliable 35-item instrument, coefficient alpha reliability for the TQ items of a $\alpha=.89$) developed by Schreiner to determine if differences existed between first generation students and their classmates with respect to non-cognitive factors measured by the instrument such as engaged learning, academic determination, positive perspective, diverse citizenship, and social connectedness. The survey was administered to fall 2018 first-year students enrolled in the programs (N=115), 40% are whom first generation in college students. Working to describe, understand, and compare differences among student groups can assist researchers in the development of appropriate mechanisms to increase students' non-cognitive thriving components and ultimately lead toward increased student success.

087

Oral

Using the BEVI to Interpret Intercultural Experiences in an Agricultural Study Abroad Program

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Successfully interacting with others in the diverse environments of both educational and work settings requires intercultural competence, positive attitudes towards difference, and willingness to interact across cultures. Enrollment in agricultural study abroad programs has increased over the last several decades. However, few studies have addressed whether these programs provide students with critical cultural, communication, and self-awareness skills. An embedded study abroad program was developed with a focus on food security and environmental challenges in Vietnamese agricultural system and to develop student intercultural competencies. Implementing various intercultural learning activities throughout the semester, researchers anticipated positive development in three areas measured quantitatively by the Beliefs, Events, and Values Inventory (BEVI): critical thinking, openness, and environmental concern. While overall group scores did not increase on the three scales, in a more detailed analysis, interesting patterns emerged regarding differences in gender and preparedness. For example, the critical thinking scale revealed regression of nearly 20 points from both female and Non-Caucasian participants while scores of males and Caucasians remained stable. Similar, interesting patterns were identified throughout this small cohort (n=11). The data suggests potential curriculum changes and utilization of different resources to support individual student needs. For example, addressing cross-cultural differences in gender roles more in depth. Study findings indicate a need for better understanding of individual student experiences in cultural immersion programs to capitalize the development of intercultural competence skills.

088

Poster

Evaluating Intercultural Competence in a Combined Learning Community Study Abroad Program

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Given the vast nature of agriculture and its related fields, it is imperative that students studying in these areas are prepared to interact and engage globally. Agricultural employers seek graduates with intercultural competence (IC) skills. Study abroad programs can provide students with these skills if deliberately implemented. With this in mind, a combined Learning Community and study abroad program was developed for freshman and sophomore students in animal sciences. The objective of this study was to explore and describe student IC development before and after participation in the study abroad program. Nineteen students traveled to Italy for 10 days in July 2018 to learn about Italian animal production practices. A follow-up course met once a week during the 16-week fall semester. Throughout the program, students completed activities designed to develop self-awareness and awareness of others. IC was assessed with the Intercultural Development Inventory three times: one week prior to travel (T1), week one of the fall semester (T2), and the final week of the fall semester (T3). From T1 to T3, the group progressed on the Intercultural Development Continuum (IDC) from high polarization to low minimization. Though group movement was minimal, individually, 42% of students advanced on the IDC and 26% progressed into a new stage on the IDC. Possible limitations to group growth include destination, duration, and pre-departure preparation. Future studies are needed to explore these factors and assess impact on developing IC in study abroad programming.

089

Oral

Evaluation of Student Engagement Across Differing Introductory-Course Activities

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Student engagement is critical for learning. Instructional tools utilizing active, problem-based learning have been shown to increase engagement. However, limited research has explored what specific aspects affect student engagement when implemented in an academic environment. This study examines how instructional activities (lectures, laboratory stations, and case studies) affect student engagement in an undergraduate introductory animal science course. The objectives are to 1) assess the extent the activities influenced student engagement, 2) determine how engagement differs between activities, and 3) identify influential aspects of the activities on student engagement. Students (n=178) were randomly placed into groups of 5-7 members. Then, groups completed the assigned 10-minute activity. Groups completed each activity once within three different experimental periods via Latin Square design. Engagement was assessed through student self-report post-activity questionnaires, behavioral observation, and a post-course focus group. Percentage of students behaviorally engaged was significantly lower during lecture (62.1%) compared to lab stations (86.0%) or case studies (77.6%). Self-reports corroborated these findings and identified aspects within treatments that students found most engaging, such as group discussion and manipulation of physical materials. Post-course focus group responses elaborated disengaging aspects such as excess time and overly large groups. The results of this study provide evidence of implementable instructional strategies that influence student engagement and should be considered when designing future learning environments.

090

Oral

Motivational Effects of Various Instructional Formats in an Introductory College Course

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This study examines college students' interest and motivation relative to three instructional formats used in an introduction to animal agriculture course: hands-on, problem-based laboratory stations; problem-based written case studies; and video lectures. The course's 178 students were split into groups of 5 to 7 students and assigned learning activities as treatments in a Latin Square arrangement consisting of 3 experimental periods. At the beginning of the course's laboratory session, students completed 10 minutes of the experimental activity immediately followed by a questionnaire. For laboratory station activities, students worked in small groups to complete writing activities and tasks involving physical objects. Case studies involved group work on written problem-based scenarios. For video lectures, students watched voiced-over slides. Students rated laboratory stations as significantly more challenging, novel, and attention-grabbing than case studies or video lectures. Both interest and intrinsic motivation were greatest for students completing laboratory stations followed by case studies and video lectures, respectively. In a situational sense, interest was very strongly correlated with intrinsic motivation. These findings indicate that hands-on, problem-based activities may be more interesting and motivating to students than written problem-based activities or video lectures.

091

Poster

Using the Engelbart Organizational Learning Schema to Frame Professional Learning for College Educators

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In an ever-changing higher education climate, the need for improving instruction has never been as compelling or as challenging as it is today. The new trend of cross-institutional and globalized education continues to define higher education and impact the way quality teaching is conceptualized, facilitated, and evaluated. Previous studies have identified a significant gap in literature on the impact of the outcomes of instructional development at the meso level. The meso level focuses on such things as the relationship between professional learning and institutional culture, institutional and department practices, and teaching

teams. Keeping this in mind, this case study of the professional learning unit for the Department of Defense Education Activity (DoDEA) explored professional learning outcomes when the Engelbart Organizational Learning Schema is used to frame three types of professional learning events for educators focused on facilitating a culture of continuous improvement in instruction. Level-A is individual learning, Level-B is learning within a unit, and Level-C is learning across units within an organization. Analysis of 16 focus group sessions with educators who participated in the aforementioned professional learning yielded the following outcomes: 1) an increase in commitment to the work of improving instruction; 2) an established structure for instructional coaching and support; and 3) an alignment of participants' instructional practices with the academic goals of the institution. Accordingly, this schema provides a feasible structure for colleges seeking to incorporate instructional professional learning into their academic culture.

092

Oral

Master's Program Selection and Satisfaction Factors for Agricultural Education Alumni

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The purpose of this study was to compare on-campus and distance students on factors related to master's program selection and satisfaction. The population consisted of all 135 graduates of the master's program in Agricultural Education at Iowa State University over a ten-year period. Data were collected with a questionnaire by US mail. Face and content validity were established by a panel of experts and Cronbach's alpha showed acceptable internal consistency for the Likert-type scales. The response rate was 70%. The three most important factors for program selection for on-campus students were the curriculum, the university's reputation, and the reputation of program faculty. The top three factors for distance students were the curriculum, a flexible schedule, and time to degree. Both on-campus and distance students considered marketing and promotional materials as least important by far. Students were asked to indicate their level of satisfaction with 18 program characteristics or elements grouped into four subscales. Distance students were more satisfied with the procedures for getting started and with course offerings. On campus students were more satisfied with interaction and financial aspects of the program. The only statistically significant difference was on financial aspects. Less than one quarter of distance students were satisfied or very satisfied with the availability of scholarships. The study has implications for student recruitment and for maintaining student satisfaction once enrolled. While on campus and distance students have many things in common, there are important differences that faculty should consider in designing and implementing graduate programs.

093

Poster

Academic and Professional Impacts of a Master's Program in Agricultural Education

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The purpose of this study was to evaluate the academic and professional impacts of a master's program on on-campus and distance students. The population consisted of all 135 graduates of the master's program in Agricultural Education at Iowa State University over a ten-year period. Data were collected with a questionnaire by US mail. Face and content validity were established by a panel of experts. The response rate was 70%. Program graduates were asked to rate their level of competence and the extent to which the master's program positively impacted their competence on eight program outcomes. Cramer's V was used to determine if a relationship existed between group (on-campus and distance) and self-ratings. The magnitude of the relationships ranged from negligible to low and none were statistically significant. Most graduates rated themselves as proficient or expert on 8/10 outcomes. They rated themselves highest on instructional delivery systems and lowest on international agricultural education. Most graduates rated the extent to which the degree program made an impact on their competence as somewhat or to a great extent for 9/10 outcomes. The greatest program impact was on their philosophy of agricultural education and the least impact was on international agricultural education. More than three quarters of both on-campus and distance students reported that a change in their occupation was positively influenced by the degree. The

degree program positively impacted the academic competence and professional standing of graduates regardless of whether they studied on-campus or at a distance.

095

Oral

Bringing Agriculture and Non-Agriculture Students Together to Develop Mutual Understanding

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The objective of this study was to address the perception of agriculture by non-agriculture students, and agriculture students' beliefs about those perceptions. In Fall 2018, nine agriculture majors at Illinois State University were paired with nine non-agriculture majors to discuss the industry and issues that farmers face. Through questionnaires administered prior to this experience, we measured the non-agriculture students' opinions about the industry, and the agriculture students' assumptions about those opinions. Each of the agriculture students saw themselves as advocates for the industry, and ranked themselves, on average, as "moderately confident" in their ability to communicate with non-farmers about agriculture. On a scale ranging from 1 ("Very negative") to 5 ("Very positive"), non-agriculture majors reported a more positive opinion of agriculture than what the agriculture students believed that group's opinion to be ($p < 0.001$). On a scale ranging from 1 ("Negatively biased") to 3 ("Positively biased"), agriculture students perceived a more negative media bias toward agriculture (1.30 vs. 1.67). Follow-up questionnaires evaluated changes in the perceptions and beliefs of both groups as a result of this experience. On average, the agriculture students reported improved confidence in their ability to communicate about the industry and less negative media bias toward agriculture, while the non-agriculture students indicated a more positive overall opinion of agriculture, greater familiarity with farmers' issues, and a slightly more negative media bias. This pilot study is an important first step toward our overall goal of developing mutual understanding between agriculture and non-agriculture students, and data collection is ongoing.

096

Oral

Evaluating Online Modules Contextualizing STEM in Poultry Science for Secondary Students

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Recent policy reports have demanded more effective education resources to support workforce needs and address deficiencies in STEM and agricultural literacy among U.S. citizens. This research assessed an education program for secondary students integrating STEM education with poultry science. We designed seven 30-minute online modules to supplement instruction in agriculture and biology courses. Module content included basic hen management and welfare principles presented through text, videos, and interactive games. Participants were 499 students in 23 classrooms who used the modules in the Fall 2018 semester and served as a single treatment group in a mixed-methods study assessing program effectiveness. Before and after the program, students completed an online questionnaire measuring interest and self-efficacy in STEM through Likert-scale and open-ended questions. In addition, students completed ten 1-point content questions before and after the first six modules. Following the program, teachers responded to open-ended prompts. After excluding incomplete entries, data were analyzed from 175 student responses matched from pre- to post-questionnaire (35.1%) and 9 teacher respondents (56.2%). For each of the six content quizzes, significant increases in students' knowledge were observed after completing the modules (Cohen's d effect size = 0.80, 0.77, 0.63, 0.50, 0.45, 0.67; $p < 0.001$). Students reported no change in the likelihood of pursuing STEM-related careers following the modules, and decreased STEM self-efficacy (Cohen's d effect size = -0.32, $p < 0.001$). However, qualitative responses from both students and teachers indicated that the program's contextualization of STEM and interactive features enhanced student learning and interest.

097

Oral

The Effects of Social Identities on Student Learning Outcome Attainment

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As the field of agriculture continues to diversify, educators must be prepared to equip students to effectively work in multicultural environments. AGR 201, Communicating across Cultures (CaC) is one undergraduate course that exists to achieve this goal. Students' worldviews, belief, and values dramatically shape their experience with the course materials and learning exercises and potentially impact the degree to which they achieve the intended learning outcomes. The objective of this study was to determine which aspects of students' identities are most salient to their experiences in CaC. We report on a program evaluation using the Beliefs, Events, and Values Inventory (BEVI), an analytical instrument that attempts to assess transformative learning was administered as a pre-/post-test at the beginning and end of the Fall 2017 and Spring 2018 semesters. T1 to T2 changes in scores on various BEVI scales emerged in interaction with several demographic variables. Based on between group differences in BEVI scores, Race/Ethnicity, Gender, Political Affiliation, and National Origin all were social identities that meaningfully impacted students' experiences in the course. Based on these findings, we suggest some best practices for approaching the different layers of culture present in similar courses, and we provide examples of how we are working to engage students who are more resistant to intended learning outcomes or may need more support to remain emotionally resilient in a challenging curriculum.

098

Poster

Exploring the Process of Designing an Effective Post-Secondary Curriculum in Preparing Agricultural Education Graduates for the Nigerian Workforce

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The problem of ineffective curriculum has been identified as one of the major challenges facing the field of agricultural education in Nigeria, as it produces graduates lacking the skills needed to meet the demands of the industries. The purpose of this study was to explore the process of designing the curriculum of all courses taught in the department of agricultural administration at the University of Agriculture, Abeokuta, Nigeria; and determine whether the curriculum aligns with industry needs. The theoretical framework guiding this study is the program planning theory. The process of program planning requires the involvement of stakeholders and negotiation of power among stakeholders bringing their belief to the planning table. This study used a phenomenological inquiry into the professors' conscientious meaning experience as well as the educational experiences of the alumni. We used a purposive sampling method to select participants, as we needed individuals close to the phenomenon (i.e. professors involved in the curriculum design and alumni trained with the curriculum). The sample comprised of four professors and five alumni. Results indicated four themes from the data analysis: 1) The university's goals were taken into consideration while designing the curriculum; 2) Professors were involved in the development of the curriculum; 3) An established standard was used in designing the curriculum; 4) Measures were put in place for curriculum assessment. The result of this study enabled us to provide recommendations to help improve the department's curriculum to reflect the technical and soft skills that are required in the industry.

099

Oral

Sojourner and Apprentice: Graduate Student Experience in Agriculture and Life Sciences

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The trajectory of graduate students in Virginia Tech's College of Agriculture and Life Sciences can vary widely, with career opportunities spanning the academic and practice-based fields. Many communities of

practice (CoP) can be identified within departments, colleges, fields of inquiry and research, extension and outreach. Students encounter boundaries during their interactions and relationships and either choose to participate or are given access to participate at different levels. In order to support the academic and career trajectory of graduates, a landscape level view is needed. This view allows for a clearer understanding of the graduate student experience, participating at times as visitors passing through (sojourner) or as integral members within the community of practice (apprentice). In this session I will explore graduate student identity work within Agriculture and Life Sciences graduate programs; focusing on resilience, navigating tensions, and strategies for thriving. The creation of reflective spaces and effective mentorship from peers and faculty significantly impact graduate student movement within and between CoPs. After this session participants will be able to (1) identify a CoP within their department/college and recognize their own level of participation, (2) understand the experience of graduate students as sojourners and apprentices within their disciplinary community of practice, (3) respond to graduate student needs as professionals within the department/college, and (4) apply best practices for advising and mentoring graduate students in Agriculture and Life Sciences.

100

Oral

Evaluating the M in STEM: Math Anxiety as a Predictor of Quantitative Course Success

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While many studies have investigated factors influencing students' performance in various courses, few have considered students' self-perceived mathematics anxiety, and its association with their performance in math-related agriculture courses. The objective of this study was to investigate the relationship between students' self-reported perceptions of math anxiety after taking a short diagnostic basic math quiz, and their grades in three quantitative agricultural courses including Quantitative Methods in Agriculture and two Agribusiness finance courses (intro and advanced). Literature review revealed that while some studies have identified sex as a contributing factor, others have not found a correlation. Further, studies have been inconclusive as to whether weak algebra skills put students at a disadvantage in accounting courses. We analyze a sample of 398 students (42% female, 58% male) at Sam Houston State University enrolled in 18 course sections between 2013 and 2019. Each student began their semester by taking a twelve-question math quiz, followed by an open-ended question used to evaluate the "scariness" of the math they saw on the page. We use the Seemingly Unrelated Regression procedure in STATA to evaluate the influence of a self-reported measure of anxiety, the results of the diagnostic math quiz, and various demographic factors, on three dependent variables: the final course grades in the three quantitative courses noted earlier, to identify the aspects that significantly explain grade variations. Results indicated that students who believe math to be daunting perform worse on the quiz and earn lower grades in their quantitative coursework. Math basics have been added to the curricula of each course.

101

Oral

Pre and Post Formative Assessment of Students Intercultural Openness on a 1-week Study Abroad Service-Learning Experience

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Documenting student intercultural learning and development outcomes from study abroad experiences are vital to assessing the effectiveness of the programs. However, due to the breadth of study abroad programs that vary from one week to one year, finding an appropriate assessment or making modifications of an assessment can be difficult and impractical. The current study examined the effectiveness of an intercultural openness instrument developed at Purdue known as Attitudes, Skills, and Knowledge Short Scale (ASKS2) in measuring intercultural learning during a one-week service-learning study abroad program to Cartagena, Colombia. The ASKS2 was administered to 15 program participants using pre-test post-test methodology. The findings indicated that the program had a statistically significant impact on the intercultural openness and personal development (empathy) of the student participants. Moreover, qualitative data from students'

daily reflection journal entries supported the quantitative findings, specifically in item analysis. Taken together, the findings reinforce the selection of the ASKS2 as an appropriate assessment for short-term study abroad programs. Future research includes the continued use of the ASKS2 for the next 3-5 years in order to provide a larger sample of evidence of its assessment effectiveness. This session would benefit anyone who facilitates learner centeredness, student learning and intercultural experiences and/or who selects assessment instruments for intercultural learning.

102

Oral

Reusable Learning Objects: What Students Are Really Thinking

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Technology in the classroom can take many forms and is often designed in a way to complement instructional objectives. The purpose of this research was to identify the extent to which students perceived the use of scenario-based Reusable Learning Objects (RLOs) in the classroom as a positive teaching tool. Upon completion of the Global Thinking Academy, which included 16 weeks of modules on critical thinking, instructional design, scenario development, teaching contentious topics, and global food security and hunger, faculty were invited on an international experience to gain first-hand exposure to these topics. They then created scenario based RLOs reflecting specific disciplinary topics in an international setting to implement in their courses over the spring and fall semesters of 2018. Students who completed the scenarios were invited to provide feedback via a Qualtrics-administered questionnaire. Student participants tended to have positive perceptions about the use of RLOs as an instructional tool. Most participants agreed or strongly agreed that RLOs are enjoyable, convenient, and should be used more often. Participants also tended to report that RLOs provide them with learning opportunities they would not otherwise have and should be utilized more often for instruction. However, despite 42.01% of participants preferring RLOs to traditional classroom instruction, 20.66% indicated they felt more isolated as a student when taking courses that use RLOs. The value of online instructional tools should be considered when implementing in the classroom. Online content, balanced with student-to-student engagement, can strengthen the perception of the learning environment and ultimately the learning taking place.

103

Oral

“TREASURE” SAE: The Teacher Rejuvenation for Enhancing Agriscience Students’ Utilization of Real-world Experiences Virtual Simulation Game

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Although 57,900 highly trained workers are needed to fill annual vacancies in the agricultural, food, and natural resource industry, only 35,000 graduates complete an agriculturally related bachelor’s degree annually. A need exists to increase middle and high school student awareness and interest in agriculturally related jobs. Therefore, the TREASURE SAE Professional Development Program assisted agricultural education teachers with increasing student awareness and interest in agriculturally related careers through hands-on supervised agricultural experience (SAE) programs. SAE programs are individually developed experiences where students apply classroom knowledge to real world activities (i.e. apiary for honey production or working for a local veterinarian). The objectives of this presentation are to (1) describe the steps to developing an online, virtual simulation game for teachers and (2) reflect on the data collected from teachers about the game’s usability. Middle and high school teachers engaged in a scenario-based online professional development simulation designed to increase their proficiency at student engagement. The development of the simulation took two and a half years with pilot testing each virtual community scenario, gathering teacher feedback, and testing game components designed to reveal important take-home messages about work-life balance, community engagement, and student SAE experiences. Findings from

workshops where teachers pilot tested the simulation revealed that the simulation provided a positive change to teacher professional development. Based on these findings, college faculty who provide professional development for teachers should consider collaborating with technology and education design professionals to develop simulations which allow for teachers to engage in meaningful learning environments outside the formal classroom.

104

Oral

Effects of Critical Reflection on Student Cognitive Achievement after an Electrical Measurement Laboratory Activity

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Experiential learning theory posits that critical reflection plays an integral role in helping students to process and construct meaning from laboratory activities. The purpose of this experimental study was to determine the effect of critical reflection on student cognitive achievement following an electrical measurement laboratory activity. Students (N =21) were randomly assigned to either a control group or one of two treatment groups. The control group (n = 7) did not receive a reflection assignment after completing the measurement lab; one treatment group (n = 7) completed a collaborative reflection activity immediately following the lab activity; and the other treatment group (n = 7) completed an individual reflection assignment immediately following the lab activity. Students in all three groups completed a 10-item multiple-choice quiz (coefficient alpha = .67) based on the lab content. The individual reflection group had the highest mean score (M = 8.00, SD = 1.29), the collaborative reflection group had the second highest mean score (M = 7.42, SD =1.81), and the no reflection group had the lowest mean score (M = 5.71, SD =2.13). The Cohen's f of .47 indicated a large effect for reflection on student cognitive achievement. These preliminary results suggested that adding a required reflection component following completion of the laboratory activity improved student cognitive achievement.

105

Poster

Assessment of Student Preparation in Job Interview Readiness Skills in Agriculture

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Preparation of students entering the workforce is one of the primary goals of undergraduate education. However, most preparation is on specific subject matter rather writing cover letters, resumes, and other materials needed to obtain a job interview. The objective of this research was to assess the preparation of students from different majors (Ag Business (AGBU), Animal Science (ANSC), Plant Science (PLSC), Ag Communications (ACOM), Ag Engineering Technology (AGET) and Interdisciplinary Ag (AGRI)) enrolled in a single capstone course. A cover letter, resume, and reference page from each student were graded by rubric and the scores of each were allocated into grade quintiles, each representing 20% of the total possible score. Success was determined for each major based on the number of students receiving a particular score in each quintile. When assessing the cover letter, 2/3 of ACOM students scored in the top quintile, as compared to AGBU and AGRI, for which less than 1/3 of students scored in the top quintile. In reviewing resumes, at least 2/3 of ANSC, PLSC, ACOM and AGBU students scored in the top quintile. For reference pages, all majors had over 2/3rds of their students scoring in the top 20% of scores on the rubric. Based on these results, the prior course work in the ACOM and PLSC majors prepares students well for seeking a job interview, while AGET students did not perform as well. Assessments like these will help programs better understand where their strengths and weaknesses lie, and better help their students succeed.

Understanding of Food Labelling by Students Enrolled in a Capstone Senior Seminar in Agriculture

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Consumers are faced with more decisions regarding food choices now more than ever. The marketing of food labelling with differences in pricing and selection often leaves consumers wondering whether they are making the best choices for them and their families. The purpose of this study was to examine food labelling understanding of senior level undergraduate students enrolled in an agricultural related degree at a four-year land grant university. Responses from 57 students (n=57) were collected through open-ended questions on the following food label terms: organic, all-natural, cage-free, free-range, gluten-free, non-GMO, and grass-fed. Researchers conducted a content analysis comparing student definitions to USDA and FDA labelling definitions. Overall, very few students demonstrated a completely accurate definition of these terms. In searching for specific definitions, there was a great deal of conflicting information from Internet sites marketing these product labels likely adding to the confusion for students. For example, terms like “healthy” and “fresh” were associated with organic product labels demonstrating that the marketing for organic products is misleading consumers, even those with an agricultural degree. Agricultural educators are challenged to develop strategies to combat misinformation in food product labels to best educate consumers and students in our programs.

Online Instructional Resources for Undergraduate Animal Breeding and Genetics

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Traditional undergraduate students now belong to Generation Z, the first generation born into a completely Internet-connected world. Media and technology have been an active part of these students' daily life and learning since birth. Instructors teaching in today's academic climate must be prepared to use software, hardware, and digital, technological and social media to evolve with the student demographic in the classroom. While there are technology and media-rich teaching resources available for biology topics, most fail to address concepts related to genetics of domestic animals. Fewer, if any, of these enhanced educational tools include genetic selection and breeding concepts. Furthermore, most tools that are available are incomplete, of poor quality, and/or lack accessibility. The scope of this project was to create high quality, interactive videos and documents for students to use as learning materials for concepts taught in a junior-level undergraduate animal genetics course. Eighteen interactive online educational tools covering course concepts have been created by 3 undergraduate students who previously completed the course. A total of 160 students are enrolled in the course for Spring 2019. All students attend an in-person lecture 3 days/week, and a recitation 1 day/week either in an in-person (100 students) or an online (60 students) section. Effectiveness of each online tool will be assessed throughout the semester measured by students' use and perception of online materials as well as summative and formative assessment statistics. Results from this study will provide validated open educational resources to the animal breeding and genetics community.

So, You Want to Change the World? Strategies to Increase Creativity in Agriculture Classrooms

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Creative and innovative solutions are vital to addressing critical challenges facing the agriculture, food, and natural resources industries, such as water shortages, food deserts, sustainability pressures, nutritional demands, and countless other global issues. Creativity is also one of the most sought-after qualities in new employees, but sadly, nearly three out of four people in the United States do not feel like they are living up to their full creative potential. Educators and communicators must find new ways to engage students in the creative process. Therefore, the purpose of our workshop is to introduce strategies to develop creative and innovative thinking within agricultural education and communication courses. Our objectives are to define creativity; determine the difference between convergent and divergent thinking in agricultural education; implement Wallas' five stages of creative thinking—preparation (identify the problem), incubation (brainstorm possible solutions), intimation (connect solutions with possible stakeholders), illumination (consider additional options), and verification (analyze effectiveness of ideas)—into lesson plans; and explore the use of strategies, such the Torrance Tests of Creative Thinking, in an agricultural education context. In short, creative thinking is available to all people, can be developed, and can be measured. By equipping educators and communicators with creative thinking strategies, we can improve the scholarship of teaching and learning and empower students to develop creative and innovative solutions to the world's critical challenges.

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Poster

Exploring Path-Goal Leadership Theory and Its Implication for Academic Advising

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Hopefully every student comes to an institution of higher education with an end goal in mind of obtaining a degree and graduating. Academic advisors know the path and sometimes-intricate journey that students must walk to accomplish that goal. Academic advisors can assist students in clarifying their goals, overcoming their obstacles, providing resources and support throughout their journey, and hopefully motivating them to achieve their personal brand of success along the way. In leadership theory, this process and interaction is explained best through House's Path-Goal Theory. In this theory, the relationship between the leader and the 'subordinate' has a direct effect on motivation, output, and outcomes. Essentially, this leadership theory includes a leader choosing which leadership style will meet the needs of their particular 'subordinate' at any given time. This leadership theory has direct implications to the profession of academic advising and academic advising methods. Academic advisors can implement this leadership theory into academic advising practices by utilizing the alliteration of potential, passion, pathways, and purpose to help students define goals, clarify their educational paths, overcome obstacles, and provide support.

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Oral

Audience Engagement Techniques Utilized by Agricultural Course Instructors

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Student engagement and motivation are essential to effective instruction in a classroom setting. For instructors to maintain and encourage student engagement, presentation techniques are incorporated into their instructional delivery. Students enrolled in "Presentations in Agricultural Organizations" course at North Carolina State University during two semesters were instructed to evaluate an instructor from within the College of Agricultural and Life Sciences on audience engagement techniques utilized during instruction. Students were instructed on the different engagement techniques and provided examples of their use during class instruction in the course prior to this assignment. Students completed an evaluation checklist containing 20 engagement techniques, provided comments on the techniques observed and described how the instructor gained interested at the beginning and end of class. From both sets of students (n=43) enrolled in "Presentations in Agricultural Organizations," posture and movement was the most observed audience engagement technique with 93% observing this technique followed by personal experience (91%), storytelling (spring 2019 students) and humor (fall 2018 students) ranking third, humor

(spring 2019 students) and note-taking (fall 2018 students) ranked fourth followed by questioning techniques ranking fifth in both sets of students. This data implies that instructors maintain engagement through movement, humor, and sharing personal experiences related to the topic. University faculty should consider professional development training on utilizing various audience engagement techniques within the classroom to support curriculum instruction. Future research focusing on a set discipline and targeting a specific assessment or evaluation program would help to provide insight to the impacts of engagement techniques on student learning and achievement.

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Oral

Unannounced Online Quizzes Encourage Attendance, Engage Students and Reinforce Concepts

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In a large class, it can be difficult to connect with and engage students. More confident students often voluntarily interact with the professor, but many students are not comfortable speaking up in a large class. Without direct interaction with most of the students, it is difficult to gauge connection and comprehension. Students who don't feel connected may elect not to attend or may focus their attention elsewhere. Encouraging students to attend is important but calling role for large classes is time-prohibitive and does not provide much beneficial interaction with students. Using technology has provided a way to connect with more students and to quickly take attendance in a large class. Most college students have a smart device or laptop. This device may distract students, but the same device can also be used as a learning tool to engage students and gauge their progress. Kahoot! is an online quiz/survey tool that anyone can use on any smart device. Kahoot! generates a report after each quiz of each participant. Having students use their ID number allows for the use of a spreadsheet lookup function to quickly match up grades for input into a learning management system. Kahoot! grades make up a small percentage of a student's overall course grade and are graded solely on participation. Regular, unannounced Kahoot! quizzes review the previously covered material and provide a way to encourage attendance, engage students and gauge learning across a broader sample of students. Key concepts can be reviewed and reinforced as necessary.

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Poster

Meeting Community and Student Needs through Service-Learning Course Projects

Shannon Arnold* and Jessica Sheperd
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Service learning is an effective teaching method to support educational instruction and expand students' professional skills. This approach connects academic theories to real world experiences through integrated learning. In this presentation, participants will increase their knowledge of merging service-learning projects into coursework using community partnerships. Through course instruction, students work as a team to develop needs-based educational opportunities for communities. The authors will outline the establishment of project ideas, funding, collaborators, guidelines, course content, teaching activities, timelines, and outcomes. Course examples to be discussed include the development of a STEM youth day camp, an "AgVenture" elementary program, a Farm to School "Festival," "Kids University," and an extension volunteer educational series. Using this approach, students gain an understanding and appreciation for outreach programming, youth and adult education, service learning, and the integration of STEM concepts into teaching. Audiences develop knowledge, interest, and life skills in agricultural subjects. This unique educational strategy encourages cooperative learning in cross-disciplinary problem solving and curriculum integration with real-life application. Service-learning projects can have profound effects on students and communities, such as improved self-concept, positive attitudes, motivation to learn, and increased engagement. However, both audiences need to be directly involved in the planning process, feel challenged, have responsibilities, and given decision-making capabilities about the project to establish ownership.

Land-Based Learning Centers: On-Farm Learning About Sustainable Agriculture

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Land-based learning centers (LBLC) offer a model for students to learn from farmers implementing sustainable agricultural practices, providing on-farm, active learning opportunities for them to learn about careers in agriculture. There are seven Intermediate School Districts (ISD) in Michigan's Upper Peninsula, each with a land-based learning project currently in progress. These projects have a high-school teacher, their students, a producer, and a Michigan State University Extension educator working together to make a local farm more sustainable. For example, a sheep producer is working with a high school biology teacher and his environmental science class to improve the soils of hay fields in a regenerative way that is good for the environment and economically viable. The local Extension educator serves as the facilitator between the teacher, students, and the producer. After identifying the farm, students meet with the producer to understand the farm by taking soil samples, interpreting results, and learning about agriculture in their community. Now, students are working collaboratively with the farmer and Extension agent to test multiple interventions to increase soil health on the farm. At each LBLC, student assessments indicate change in areas of general self-efficacy and sustainable agriculture career aspirations. Interviews with teachers and farmers describe a positive change in attitudes toward sustainability. This innovative approach positions students to address big picture issues in their communities – such as farm succession and food insecurity – while also involving students in decision making through their working relationship with LBLC farmers to develop feasible solutions to on-farm sustainability issues.

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Oral

Engaging Undergraduate Students in Research through a Quantitative Methods Class in Agriculture

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Past studies have shown that undergraduate research experience has contributed to students' academic and professional development. Four agribusiness faculty members successfully developed a teaching innovation program that incorporated research experience into a quantitative class in agriculture. Sourcing from various databases in agriculture, the faculty members formed six research projects each semester for students to practice their quantitative skills in a real-world setting. With assistance from faculty mentors, each student team consisting of five members established appropriate hypotheses, utilized quantitative methods such as multiple regression, logistic regression, and ANOVA to analyze the data, and interpreted research findings. They were required to develop a research poster detailing the methodology, results, and conclusions and present their poster in class on the day of the final exam. Based on feedback from faculty mentors and other faculty members in the department, the teams presented the revised posters in a research conference such as the Undergraduate Research Symposium of the university and the Agricultural Consortium of Texas Research Symposium (ACT). Two teams won the first and third places during the 2018 ACT poster competition. Their research focused on the water use efficiency of corn and cotton, and the relationship between soil water content and Bowen ratio in a corn field, respectively. IDEA student course evaluation results from the previous four semesters indicated that students in general were highly satisfied with the research projects, creative activities, and their instructor and faculty mentors.

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Identify Early, Retain Early: Best Practices from an Introductory Food Science Class

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The overall goal was to report some of the best practices that resulted in improved retention in a freshman level introductory food science class (Fundamentals of Food Science; FDSC 1133). The current observation is from 1100 students enrolled during 11 semesters (spring 2013 to spring 2018) at Oklahoma State University. On average, 40% of the students enrolled in this class were freshmen. Approximately 3-5% of the students enrolled during the first four semesters (spring 2013 to fall 2014) withdrew/dropped the class and 2% received an F. Some of the practices introduced by the instructor were: 1) creating a personal connection with students and 2) proactively reaching out to the students. If a student performs poorly on the first two quizzes indicate that that the student needs help. If a student performs poorly in exams/quizzes, additional assignments have greatly improved the overall performance in the class. 3) Preparing students for exams. The students are prepared for exams by providing review questions at the end of each lecture, practice tests, or giving optional review sessions before each exam. Approximately, 80% of the struggling students will not reach out instructors. The students who showed no motivation or no interest in the subject or have personal/family issues were less effective with the above practices. Based on 11 semesters of observation, personalized attention, reaching out early, and flexibility in teaching or assessment can enhance student retention up to 98-100% in a freshman level introductory food science class.

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Poster

Does Peer Interaction Enhance Problem Solving?

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Evidence-based teaching practices cite active learning as a key to effective education. Although diverse, active learning strategies share the practice of student engagement with course material, and the goal of higher-order learning. The objective of this study was to evaluate the impact of peer interaction on active learning, reflected by performance on in-class projects and on exam questions corresponding to these projects. Projects were given weekly during a large genetics class (two sections, n=250), and allocated approximately ten minutes of class time. Students were encouraged to work with a neighbor but allowed to work individually. Of the ten project-exam question pairs studied, the mean project score was equal or higher for group submissions on all but one question and reached statistical significance on three questions ($p < 0.05$ on unpaired t test comparing group vs. individual scores). On corresponding exam questions, students who worked in groups scored higher on nine of the ten questions, with one difference reaching significance. Questions with the greatest performance difference were generally those requiring greater synthesis and application, suggesting that peer interaction facilitates higher order thinking in an immediate (project) context, with results extending to an isolated (exam) context. Student preference differed from performance, with a shift toward individual participation during the semester. In early projects, less than a third of students worked individually; near the end of the semester, more than half worked individually. Many factors influenced this study; however, the results suggest that peer interaction causes additional student effort and contributes to effective learning.

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Oral

Making the Most of Mobile Devices and Active Learning for Science Engagement

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Due to the abundance of mobile devices and applications, numerous tools and methods exist for consuming and creating online media. Tablets, smartphones, and mobile applications are not only for following and watching content, but also for recording, editing, and sharing it. Science communication students must be prepared to leverage these multimedia technologies for producing professional and appealing content to stop scrolling and capture and hold the attention of audiences via a variety of channels. Traditional lecture-

based teaching methods are not necessarily ideal for effective hands-on, skills-oriented learning that also requires cognitive focus for researching, understanding, and demonstrating scientific concepts in multimedia form. Active learning and project-based learning are immersive approaches that can be intentionally applied to engage students in real-world science communication and educational product production for impacting attitudes, perceptions, and decision-making about agriculture, food, and natural resource issues. In this session, presenters will describe science communication course approaches implemented at two universities with the goal of preparing 21st Century science communicators who utilize mobile tools for science engagement. Course assignments and projects included: 1) creating videos with iPads, smartphones, and accessories, 2) using the Google Streetview mobile application to develop a 360-degree photo tour of a campus outdoor natural teaching forest and wetland, and 3) recording, producing, and streaming podcasts about the science of superstorms via the Anchor mobile application. Presenters will also provide practical recommendations for course design, project assignments, mobile hardware, and software.

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Poster

Experiential Learning in Retailing through MANRRS Pop-up Shop

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Experiential learning is defined as any learning that supports students in applying their knowledge and conceptual understanding to real-world problems or authentic situations where the instructor directs and facilitates learning. Undergraduate Fashion Merchandising and Design (FMD) majors enrolled in FCS 481: Merchandising Math applied their knowledge and skills gained from previous courses in the FMD program and the course's retail buying concepts and calculations to a real-life retailing experience. Students operated a fully functioning, staffed shop for 3-days during the Minorities in Agriculture Natural Resources and Related Sciences (MANRRS) Annual Conference at the Koury Convention Center in Greensboro, NC. Students were divided into essential retailing teams: Store Management, Inventory Control, Visual Merchandising and Social Media. Two students filled the positions of 1st and 2nd assistant to the instructor to serve as liaisons between the team managers and MANRRS staff. Conference calls were held with MANRRS staff bi-weekly over a 3-month planning period with regular electronic correspondence to ensure timely progression. Under the professor's supervision, students developed the shop's visual presentation and layout, served as sales associates and cashiers, managed the inventory, shop, student staff and volunteers, developed its policies and customer survey, contributed markdown pricing decision, managed its social media, monitored sales and inventory to determine profitability, and analyzed customer surveys. Sales exceeded \$7,000. An estimated 650 customers visited with an overall customer survey score of 4.5/5.0. The Pop-up Shop allowed 17 upperclassmen students to learn and gain real-life retailing experience through planning and operating a retail shop.

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Oral

A Preliminary Look at Using Peer Evaluation to Improve Awareness in Agriculture Courses

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Self-analysis is a valuable skill but can be painful and difficult. Students often struggle to evaluate themselves objectively. For example, equitation students fail to recognize poor riding techniques in themselves for a variety of reasons, including overconfidence, lack of training, under confidence, incorrect methodology, bad habits, etc. Instructors should look for various methods to help challenge students to consistently assess riding and improve equitation skills. In order to increase understanding and awareness of riding practices, students are assigned to a peer group during intermediate horsemanship classes at Southern Utah University. Groups are required to view each other ride, meet and discuss observations, and provide written evaluations of each rider in the group. Faculty can take advantage of this method to reinforce principles included in class instruction. At the end of the semester, students are surveyed to assess opinions on the experience. One hundred percent of respondents reported evaluating other riders increased their

own awareness, ninety-one percent said discussing equitation with other class members improved their own riding, and one hundred percent said doing a written evaluation of other riders helped them better understand good riding. Students engage with each other outside of class, strengthen relationships, and help boost confidence and morale. Stronger or more experienced riders benefit by observing themselves more objectively and by helping weaker riders develop. Weaker or less experienced riders develop through greater support and by realizing that everyone can improve. Peer evaluation can be an effective tool to increase student understanding of good applied principles and practices.

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Oral

Integrating Project-based Learning, Systems Thinking, and Problem Solving to Save the World

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The global population's alarming growth creates an increasing number of complex issues and concerns. Addressing these issues, including climate change and pollution, requires next-generation problem solving abilities that traditional teaching strategies may not effectively facilitate. Modern approaches to problem solving, using systems thinking, are required for solution developers to create integrated solutions for complex problems. Project-based learning engages students in curated, problem-solving experiences based on real-world scenarios. In this session, presenters will share an innovative approach to project-based learning applied to an interdisciplinary, undergraduate global issues course. A sprint-like experience challenged students to apply advanced problem-solving skills and systems thinking to research, propose, develop and present a potential solution sketch. Students first experienced problem solving with others who shared similar values and interests and were later reassigned to teams based on their preferred style of problem solving. Key elements of this innovative strategy included: 1) allowing students to self-select groups based on common interests in a particular system (food, economic, environment, social, or health), 2) reassigning groups based on individual results from Kirton's Adaption-Innovation Inventory (KAI), and 3) engaging students in a comprehensive group project based on the Gold Standard Project-Based Learning Model. Each element provided a practical experience relevant to modern, complex problem solving. Presenters will highlight the success of this application and provide recommendations for implementing similar approaches.

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Oral

Developing a Creative Agriculture Classroom

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The diverse curriculum within agricultural education allows faculty to develop and foster student creativity and critical thinking. All individuals are problem solvers, and therefore all individuals are creative. Often creativity is thought to only reside in the arts and is paired with artistic ability. Kirton's connection of problem solving and creativity moves the depth of creativity beyond the arts and into creative problem solving. As instructors work alongside students to solve problems in the classroom, in the lab, or in the field, creativity and critical thinking skills are essential for success. The researchers examined constructs of creativity, and their application within the field of agriculture education. As faculty interest to include STEM, inquiry, and project-based learning increases, creativity becomes a necessary tool. As education evolves and a growing emphasis on inclusive pedagogy increases, teaching methods require innovation and variety. Creativity requires a combination of six distinct but interrelated resources: intellectual abilities, knowledge and style of thinking, personality, motivation, and environment. These resources converge in the agriculture classroom. The learning environments are important in a student's development because it shapes a student's understanding and application of creativity. For the purposes of this study creativity is defined as acts that are novel and appropriate for a specific situation. This definition amplifies the need to provide creative experiences for students to begin to identify what is novel or appropriate while problem solving.

The researchers will share proven creative practices that can be applied in many agriculture education and training settings.

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Oral

Examining Agriculture Teacher Creative Behavior

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As agriculture educators, we are constantly improving our teaching methods and management practices to encourage student engagement and achievement. One area often underdiscussed is creativity. Creativity is defined as an act that is both novel and appropriate. Defining creativity in such a way creates opportunity for understanding and utilization of creativity in the Agriculture classroom. The Torrance Test of Creative Thinking (TTCT) was developed to measure an individual's creativity level using constructs of creativity as identified by Torrance. The researchers designed a mixed methods study to examine agriculture teacher creative behavior during instruction. More specifically, the researchers ask what creative behaviors our agriculture teachers demonstrate during classroom instruction and management. The population for the study consists of agriculture teachers that participated in a creativity workshop. Convenience sampling was used to identify the study sample. Each participant submitted three videos to the research team for analysis. The researchers analyzed the 12 videos to identify creative behaviors, with codes identified by the TTCT constructs. Along with acknowledging the creative behavior, repetition and duration of the behavior were also recorded quantitatively. Behaviors presented were movement, and colorfulness, storytelling, and fantasy. By both identifying the creative behaviors as well as collecting examples of the TTCT creativity constructs during instructional time, the researchers can develop training to enhance creative instructional and management practices. The development of these materials will be used to increase teacher creative behavior that will then support both creative problem-solving and STEM education in the agricultural classroom.

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Ways to Improve the Delivery Methods and Teaching Strategies in the Extension System in Senegal: A Case Study of Thies and Bambey

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In Senegal, the rural sector has undergone major reforms due to macroeconomic policy revisions adopted by the Senegalese government. The changes observed in the agricultural and rural areas show the will of the actors to have a productive and sustainable agriculture system. The changes in agriculture have resulted in significant diversities the type of information that farmers need to grow and maintain their production skills. The result is the emerging roles of extension educators to support agricultural needs for improved production performance and to meet future challenges. The purpose of the study is to develop a set of recommendations to improve the educational program planning and teaching skills of extension educators by focusing on their approaches for teaching farmers in Senegal. The extension educators involved in the Thies and Bambey regions served as participants in this study. Researchers connected qualitative data derived from participant interviews, qualitative document analysis and observations of participants, and a final focus group for participant clarification of preliminary data. Findings revealed that student-centered teaching methods were ambiguous and confusing for participants. The confusion implies the need for clarifying these terms to help improve education and teaching practices. The participants also had a negative opinion about professional development competencies. These results originated from the challenges of learning new teaching methods, technologies and communication practices needed for continuing professional education. The researchers recommended that continuing professional education be integrated into the extension educators' expertise to improve their pedagogy and be more effective.

Evaluating Need and Specific Skills Desired by Industry for a Feed Mill Program

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A stakeholder survey was conducted to evaluate the addition of a feed milling specialization within the business management program at The Ohio State University Agricultural Technical Institute. The objectives were to determine industry; (1) demand for potential graduates, (2) preferences regarding curriculum, and (3) expectations of graduates' skills, knowledge, and abilities. A team of eight The Ohio State University faculty and staff with expertise in animal science, business, engineering, and feed mill management developed a 28-question online survey for distribution through the Ohio Agribusiness Association and Feed & Grain magazine email list. Respondents (n=84) were not required to answer each question and only 34 completed all quantitative questions. Respondents (n=35) preferred candidates with a bachelor's degree (43%) with 1 ± 1.9 (average \pm SD) positions available per company per year at this level; an associate degree (26%) with 2 ± 4.1 positions available; or had no degree preference for candidates (28%). Respondents (n=34) reported new hire salaries of $\$33,379 \pm 13,664$ with benefits packages worth $\$11,621 \pm 9,403$. Most respondents (55%; n=37) indicated it was difficult or very difficult to fill entry level positions. The top three courses selected for curriculum inclusion by respondents (n=38) were: Feed Mill Operations and Technology, Feed Quality Assurance and Animal Food Safety, and Introduction to Animal Sciences. The top ranked skills, knowledge and abilities for graduates to have included general employability (e.g. work ethic, communication), electrical and mechanical skills (e.g. equipment, operations management, maintenance), and animal nutrition. These results will inform curriculum development allowing industry to help shape graduates they will potentially hire.

Is STEM Experience Related to Student Grades in Food and Agricultural Chemistry?

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Students enter Food and Agricultural Chemistry (FAC) with diverse abilities and life experiences, including varied academic preparation in STEM courses. This results in inconsistent student performance, despite substantial academic support in the course. One hundred sixty-seven student records from four semesters of FAC were evaluated to determine the relationship between prior academic preparation and student performance. Data were analyzed using analysis of variance, correlation, and stepwise regression. Student grades were not influenced by the semester in which they enrolled in FAC. Sixty-four percent of students had completed 60 or more credit hours at transfer institutions prior to enrolling in the course. Eighty-five percent of students had previously taken college algebra or a higher-level math course and 59% had previously taken three or more science courses. The average student GPA prior to taking the course was 2.95. The most frequently earned grade in the course was a 'C' and nearly 70% of students earned a C or better in the course. Higher-level math courses ($r=0.07$, $p=0.38$) and more science courses ($r=0.10$, $p=0.18$) were related to a better grade in FAC. However, when data were subjected to stepwise regression, previous GPA, composite ACT score, credit hours completed, and score on a pre/posttest explained 32, 5, 3, and 2 percent of the variation in course grade, respectively. These data suggest that previous enrollment in STEM courses has little effect on student performance in FAC.

Preferred Learning Style Influences Student Perception of Collaborative Group Testing

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Collaborative Group Testing (CGT) allows students to retake exams in small, collaborative groups. Early research suggests CGT improves classroom environment, increases student understanding of material, reduces student stress compared to traditional testing, and raises test scores. This study evaluates student responses to CGT in three upper-division agriculture classes and how student perception of group testing is related to class grade. One hundred twenty-four students participated in team testing. Most students were 19-24 years of age and earned a grade of "B" in their respective courses. Students were surveyed after each CGT in each class. Questions on the survey instrument were designed to assess students' response to team testing, students' preferred learning style, and student demographics using a Likert-type. Data were analyzed using analysis of variance and regression. Students' responses were not influenced by course, but students did respond differently to each exam. When averaged over all questions, students 'agreed somewhat' to 'agreed' they viewed team testing positively. Students' responses to CGT were influenced by preferred learning style, regardless of exam. These data suggest that further investigation of the relationship between learning style and student response to CGT may increase understanding of the mechanism by which CGT affects student learning.

Spanning the Distance: Effective Study Abroad Pre-Departure Activities

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Students need to participate in study abroad experiences to help them develop a personal understanding of another culture and increase their global competencies. Many universities are increasing the number of short-term, faculty-led experiences. To improve students' intercultural awareness, faculty members should support pre-departure work to better prepare students for their time abroad. During the spring 2018 semester, eleven students in a study abroad course met 9 times, presented 18 different topics, learned photography and blog writing skills, contributed to discussion posts, and wrote questions for their in-country hosts. Eleven Czech students, who were currently studying at Kansas State University, and five students from the class came together for a meal. Students shared what they learned with their classmates during the next scheduled class session. One student commented: I truly enjoyed meeting with the Czech students before going to visit their country. It was a great way to get a taste of what we would be experiencing. The Mango Languages app was required to increase Czech language proficiency, but no one made it through the entire module. One student commented: I did love using Mango to learn some Czech before departing. 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.

Connecting to the Next Generation of Agriculture Teachers

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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. The TASK Force, which is an acronym for Teach Ag Students of Kansas focuses on recruiting high school and community college students to the agricultural education career. TASK Force is comprised of eight undergraduate students majoring in Agricultural Education. 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. Kansas has experienced success with the TASK Force model. 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 in the Fall 2018 semester. In addition, there were 163 high school agricultural education programs in the state during the 2012-2013 school year. The state now has 205 active programs. During the 2017 Teach Ag event, we had approximately 150 students pass through the stations. In 2018 that number rose to 300 students. Seventeen students/guests attended the 2015 Teach Ag VIP Day. We have had an increase each year with 39 students/guests in 2018. Future research will examine the impact on this program on students who graduate in agricultural education and enter the teaching profession.

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Oral

Academic Unit Merger: A World Turned Upside Down

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Universities with academic programs face a variety of challenges as they seek to serve students that are increasingly diverse in degree interests, economic constraints, social backgrounds, academic preparation, and career goals. Legislative performance funding requirements push institutions toward higher levels of student success by alternative approaches for offering expanded higher education opportunities. Simultaneously, budgetary constraints require scrutiny of current efforts and optimal reallocations of existing limited resources. Impacts on students and faculty may easily be overlooked in the administrative processes and result in expanded problems or missed opportunities. This study examines the student and faculty impressions associated with a recent merger at a small, state university of two separate academic units: The School of Agriculture and the School of Forestry & Natural Resources. The decision-making groups and individuals, external and internal impacted entities, and combination of factors that contributed to the final merger choice are described along with an associated timeline. In addition to normal demographics, student survey responses are statistically analyzed by class level, academic performance, and intended degree option. Faculty survey responses are also analyzed by rank, primary discipline, and years of experience at the institution. Responses from both major groups will be used to identify actions and decisions that facilitated the merger process, created additional obstacles to its success, or possibly both. Other institutions and their administrative leadership considering similar mergers could greatly benefit from knowing and understanding the student and faculty experiences in this case and taking appropriate actions in response to their own proposed changes.

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Poster

Perceptions of Marketing via Social Media among South Carolina Agritourism Managers

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Social media provide agribusinesses cost-free and immediate means to engage their clientele. Agritourism enterprises often rely on a word of mouth to attract their customer base; in recent years, this medium has evolved using social media. Social media provides the opportunities to engage customers before and after they visit a farm as well as during off-season. The purpose of this study was to explore South Carolina agritourism managers' use of social media for agri-marketing. The objectives of this qualitative in-depth interview study were to: 1) Explore participants' motivations for use of social media; 2) Describe participants' administration of their social media presence; 3) Explain participants' opinions about social media use for agri-marketing efforts, and 4) Identify participants' appraisal of future social media use in agri-marketing efforts. Participants responded they were striving to reach a wide variety of customers/demographics via social media. A common theme was to respond immediately to comments and carefully address negative comments and strive to correct any misunderstandings. Participants discussed that often they had to balance farm work responsibilities with the task of updating social media. One stated that "you have to

invest in it.” Recommendations from the study include engaging with Cooperative Extension communications professionals to provide a series of workshops on effective use of social media and the variety of tools available as well as developing of e-Extension publications and how-to videos on use of social media. Future study recommendations include the use of pre-interview surveys to add depth to interview questions.

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Oral

Assessing Availability of Early Intervention and Suicide Prevention Resources for Farmers

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The risks and occupational stressors among farmers are unique, compared to the non-farmer workforce, which has strong implications for the mental health and wellbeing of farmers and their families. While studies show that farmers in the Southeast are concerned about mental health and are at an increased risk for committing suicide, there is a lack of information regarding available services and institutional knowledge of delivering early intervention. Using the South Carolina New and Beginning Farmer Program (SCNBFP) Advisory Committee as a convenience sample, the objectives of the current study include: 1) Document observations of farmer stress, 2) Assess knowledge of coping strategies, and 3) Evaluate readiness of S.C. agencies to provide training for intervention and suicide prevention. An online survey was used to assess knowledge of farm stressors, coping skills of farmers, available resources, perception of farmers' stigma towards mental health services, and response to farmer stress (organizational and personal). Ten of 18 advisory members (56%) responded and a total of nine surveys contained usable data. Results indicate the top three stressors observed were financial burden (24%), weather patterns (24%), and government policies (18%). Observations of positive coping strategies included seeking social support through community events/faith organizations, time off, and delegating responsibility. Two respondents indicated that their organizations had previously offered services to reduce farmer stress. Recommendations include: (1) convene a multi-agency working group to review and adapt successful national programs for S.C., (2) develop an inter-agency referral network, and (3) increase availability, accessibility, and acceptability of health care services.

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Oral

How Handling Turtles and Snakes While Teaching Youth with Special Needs Impacts College Students' Speaking Anxiety: A Longitudinal Study

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Animal interaction can positively influence teachers and students. Although the anxiety reducing effects of interaction with dogs and cats in educational settings have been studied, less is known about the role that reptiles could have on those engaged in public speaking. The objectives of this presentation are to: (1) compare the self-reported physical and cognitive symptoms of anxiety among college students handling turtles and non-venomous snakes during presentations with special needs learners, (2) describe emotional outcomes of teaching those with special needs, and (3) determine the impact of the course, "Teaching with Animals," among five years of student participants. An online questionnaire was used to gather primarily quantitative data from 80 students who used eastern box turtles and non-venomous snakes (corn snakes and western hognose snakes) to teach youth with special needs between 2014 and 2018. Items measuring anxiety were adapted from existing psychometric scales and emotional responses to working with special needs learners were gathered qualitatively and quantitatively using existing empathy scales. Findings indicated that the mean for public speaking anxiety (PSA) before taking the course was significantly higher than the mean for PSA after taking the class across the five years. College faculty with the ability to safely integrate turtles and snakes into their classroom should provide high PSA students with opportunities to experience public speaking while holding a turtle or snake. College students felt very empathetic and compassionate toward special needs learners and were likely to seek opportunities to work with special needs learners in the future.

Agricultural Teacher Perceptions of Facilitating Inquiry-Based Instruction

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Using inquiry-based learning instructional strategies as a way to integrate science and technical concepts into secondary classrooms is a common approach in education. This study documents secondary agriculture and science teachers' perceptions of science integration using inquiry-based learning as an instructional method when teaching about animal science within their curricula after participating in a 12-month professional development program. A focus group (n=10) teachers in Nebraska were used to collect this data which was analyzed using the constant comparative method. The following six themes emerged: (a) perceived value in inquiry-based learning, (b) alignment to state and local expectations, (c) challenges and value of a 12-month program, (d) challenges in engaging science teachers, (e) confidence in teaching technical content, and (f) integrating science concepts. Teachers in the focus group described positive experiences and attitudes when using inquiry-based learning techniques in their classrooms and described an appreciation for the 12-month program, including how the approach helped to meet state standards and local administrative requirements. Logistical challenges of a 12-month program exist, but it also provides accountability for teachers. Challenges exist in engaging with science teachers, however, the program resulted in participating teachers' increased confidence in both teaching technical content and their ability to engage students while integrating science concepts into their curricula. By understanding the experiences of this group of teachers, we are better able to design and offer additional professional development opportunities that empower teachers to utilize inquiry-based learning while integrating science and agricultural concepts into their classrooms.

Extension Agents' Perceptions on Youth Life Skills Development via Livestock Exhibition

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Youth programs are a foundation to developing life skills in adolescent populations. 4-H youth programs have an abundance of activities/interests that are offered to youth. One such activity is the livestock program. Extension agents have a unique insight on how life skills are developed through livestock exhibition. The objectives of this study were to: 1) Identify the extent of involvement of extension agents with youth exhibiting livestock and 2) Identify which life skills are positively impacted through youth participation in livestock projects. A survey, adapted from Boleman, Cummings, and Brier's research on Parents' Perceptions of Life Skills Gained by Youth Participating in the 4-H Beef Project, was sent to the South Carolina Livestock/4-H Steering Committee, consisting of Cooperative Extension Service (CES) agents. A total of 14 of 19 (74%) respondents answered that their average number of years working with 4-H and livestock was 8.5 and beef and dairy cattle (74%) were the most common livestock. The rank order for the top three mean scores were: Accept Responsibility (4.69); Develop Self-Discipline (4.46) and Develop Organizational Skills (4.38). Three of these life-skill scores parallel those top findings for Boleman, et al. The life skills receiving the lowest mean score Work in Teams (3.54, SD=1.127) matched the lowest life skill score in the study by Boleman et al., (3.66, SD=1.14). These similarities indicate that CES agents who work with livestock projects agree with parents previously surveyed. Follow-up studies should explore the leadership skills through qualitative measures with 4-H members.

Teaching Organic Agriculture in 2025: An Exercise in Visioning

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While preparing tomorrow's lecture, it's a rare luxury to reflect on essential future changes in teaching. Sixteen experienced organic agriculture teachers met in Ames, Iowa to begin planning for 2025. We focused on envisioning future education by exploring four topics: expected global context of natural resources and food demands; likely state of organic farming and food systems; needed changes in course content and curricula to best prepare students; and appropriate learning methods. In conclusion, we each reflected on what was learned from the workshop. Future context includes feeding eight billion people, climate change, scarce fossil fuels and phosphorus, increasing polarization/wealth disparities, and changing rural demography. Systems will face greater organic food demand, continued globalization and consolidation, more urban/peri-urban farms, increased focus on nutrition/food safety, and growing concern for food equity. Changes in education include more emphasis on whole systems, production resilience with climate change, attention to economic/political forces, diverse crop/animal systems, global versus local food systems, and equity in access to food. Learning methods will include more hands-on experience, working closely with diverse stakeholders, empowering students, innovative interactions and learning landscape design, interdisciplinary learning, social media/multiple methods of engagement, and reflection and future visioning. Reflecting on our own engagement, teachers found challenges in thinking about the future, being open for adaptive management of learning, co-learning in multi-location sites, balancing theory and practice, and directing toward future food systems. Despite these difficulties, it is far better to envision a desirable future than being reactive and just letting it happen.

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Poster

Engaging Learners in Global Resource Management Via Participatory Platforms, Best Available Information, Diversity Enhancement and Cross-Cultural Relationships

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Land management decisions governing agricultural development, water management and land-utilization actions are increasingly challenging in the age of the technology revolution. Familiarizing of these at a student-level is crucial in contemporary society which depends upon our future thought-leaders being informed, and inclusive decision-makers. The trans-disciplinary nature of information sources may make it difficult to integrate these into training programs or student curricula. Sources of information include scientific studies, economic imperatives and the aesthetic, ethical and cultural values of the public. Integrating these elements in judicious decision making is challenging in the face of uncertainty (e.g. natural variation), imperfect understanding of the system, and/or incomplete data. Integration and up-take can be enhanced using formats of co-creation, application, hypothesis-testing and evaluation. Increased engagement levels can be achieved by providing real world rather than virtual world information. For example, the use of outdoor laboratory environments can achieve active learning to deliver concepts of ecosystem services. Group study exercises like re-enactment, cultural exchange programs and encouragement for open-forum debates has the potential for inclusion in curricula but requires levels of external advocacy and support to provide access to various levels of information. Other constraints include, social and legal license to operate (e.g. insurances, visas, travel and photographic consent). The skill set needed by current and future generations of natural resource managers encompass the use of best information available, understanding the laws that apply, appreciating and integrating social and cultural diversity and taking account of immediate, short-, medium- and long-term consequences.

Science Literacy Skill Development: Performance and Perceptions of Undergraduates

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The National Academies of Science defines science literacy as the understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity. Science literacy is thus vital for future generations to think critically and make informed consumer decisions pertaining to agriculture. The purpose of the study was to measure students' science literacy gains from an undergraduate course experience. Students enrolled in a three-credit science literacy undergraduate course (n=13) in the college of agricultural sciences were asked to complete a science literacy test in a pre/post design as well as participate in a focus group at the end of the fall 2018 semester. On the test of science literacy skills, a paired samples t-test revealed a significant gain of 11% between the start and end of the course (t=3.24, p=0.01, d=0.60). Aligned to nine skills of science literacy (identify a valid scientific argument; conduct an effective literature search; evaluate use/misuses of scientific information; understand elements of research design; create an appropriate graph from data; read and interpret graphical representations of data; solve problems using quantitative skills; understand and interpret basic statistics; justify inferences, predictions, and conclusions) two focus group sessions (n=13) provided additional insight concerning the science literacy skill development of students. Results indicated that while the course was effective at building the science literacy of agricultural science undergraduates, improving quantitative reasoning and making inferences would be prime targets for future course improvement.

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Oral

Using Blogs to Promote Cultural Plurality in An Agricultural Leadership Education Course

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Due to an increasingly diversified population, industry leaders must be equipped to address the 21st Century challenges of producing more food using a finite supply of natural resources in the context of diverse political, economic, and civil societies. However, the cultural intelligence (CQ) needed to function at the aforementioned capacity is not innate and must be developed through reflective practices. The purpose of this study was to determine if blogging on cultural plurality; the acceptance of minority identities within a majority culture, encouraged students to evaluate, reflect, and integrate a global mindset. Students from two land grant institutions (n=119) in a global leadership class wrote and responded to four blog entries throughout the semester that covered Race, Ethnicity or Culture; Religion or Belief System; Sexual Orientation or Gender Roles; and Ability or Social Status. Brown's Model of Communication Processing was used to evaluate the 646 entries and peer responses for either deflective or reflective statements. All students used reflective statements and discussed an appreciation for learning about the new marginalized culture. Additionally, most of the students wrote about incorporating this new knowledge into their worldview, while no students explicitly provided statements of rejecting the information provided in the original posts. This teaching approach is an effective way to facilitate student synthesis and evaluation. The posts demonstrated increased cultural awareness of various cultures and identities; however, increased CQ could not be determined. It is recommended that additional prompts be provided to elicit responses about students' CQ: motivation, cognition, meta-cognition, and behavior related to the new information.

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Oral

Seeding the Community with Literacy, Using Little Free Libraries to Teach Construction Skills

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Agriculture faculty members are preparing students with the knowledge, skills, and soft skills needed for employment. Incorporating service learning into skill-based courses may provide opportunities to develop hard skills while working on a broad range of competencies and builds on the desire for GenZ students to be an active in their communities while gaining personally. Service learning has been identified as a method of student development in both content and process knowledge, which also incorporates elements of growth in social responsibility. A skills-based course at West Virginia University has incorporated the use of Little Free Libraries into the development of student's abilities to safely design and work with building materials. Little Free Libraries are community boxes sponsored by individuals, clubs, or schools that provide a place for books to be left out of the elements for others to find. The small size of the projects, less than three cubic feet, leads to little waste while still incorporating the skills of project planning, materials selection, cutting, assembling, and finishing. Students are charged with finding a location for the library, designing it to fit the size requirements, ensuring that it is inviting and noticeable, and working with the community members to ultimately place the library in its final spot. They are given a small budget to purchase books to "seed" the library and thus the community. The agriculture students have taken it upon themselves to seek out agriculture positive books that help young readers learn about agriculture and promote science-based agriculture.

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Poster

Frustration, Confidence and Learning a Hot Metal Skill

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Theories have been used for many years that suggest that students being comfortable with their abilities in subjects will add to their ability to learn that subject. It has been reported that the best way to gain skills is through long hours of repetitive practice. The core of this study is an ongoing look into the best way to teach a hands-on skill, in this case welding, to students at a four-year university. Students across two semesters, in the form of a daily log sheet recorded the number of times they had performed the task they practiced that day, logged their frustration level at performing that task, their confidence level at the beginning of the task, and their ending confidence level. The hypothesis was that a level of frustration could be found that best speeds the acquisition of skill. If that level could be found, the lessons could be designed in a way to maximize the time students have in skill-based learning situations. No significant differences between groups at level of frustration and number of times performed the task. However, significance is found when level of frustration is analyzed against the ending confidence level. Further analysis indicated that students who experience a relatively high level of frustration, do indeed have a relatively high level of ending confidence in their ability when the beginning level of confidence is accounted for. This is a hopeful result for the continuation of the development of training systems for skill-based education.

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Poster

Transfer Students: Differences in Future Success

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At Sam Houston State University (SHSU), students are monitored to determine their success during their academic career. Two, student success studies were conducted, both focusing on the pathways a student took to get to SHSU and their success once they arrived. In both studies, data from students were collected over a six-year period, with five of those years overlapping between the two studies. The first study focused on incoming freshmen, either as first-time undergraduate with no dual credits earned or no community college transfer credits (FTU), a student participating in dual credit in high school and then transferring into the 4-year public university (DC), or a student from a community college (<30 hours) and then transferring into the 4-year public (CCF). The second study included FTU and DC students, but only included community college students who transferred with approximately 60 hours (CC60). In both studies, the DC students had the highest Final GPA (3.39 and 3.30, respectively) when compared to the other groups. However, in the first study, CCF students had a lower Final GPA (3.02) compared to the FTU students (3.13), while in the

second study, CC60 students had a higher Final GPA (3.19) than the FTU students (3.12). The improved performance of transfer students spending 60 hours at a community college rather than a single semester illustrates the value of a community college, but as a destination rather than a stepping-stone to a 4-year public university.

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Oral

Math Phobia in Agricultural Classrooms: A Three-Year Study of Student Attitudes and Skills

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Student success in agricultural classes often involves the successful application of STEM principles to applied topics. In the study of nutrition, lack of math skills can hinder understanding of fundamental concepts. We hypothesized negative attitudes towards math could inhibit student performance in an equine nutrition class. An online survey was distributed at the beginning (PRE) and end (POST) of the semester in an undergraduate equine nutrition class with the objectives of assessing student perceptions, skills, and previous math experiences. A shortened version of the Attitudes Towards Mathematics Inventory (ATMI) with Likert-type scale responses was used to measure student enjoyment, motivation, self-confidence, and value of math. Math skills were assessed with 10 questions on unit conversions, percentages, and simultaneous equations phrased as direct math problems or as nutrition word problems. Survey responses were collected from 110 students over three years with a mean response rate of 93.1% (SD=6.3). Percent of correct responses did not change between PRE and POST; but students were 2 times (OR 2.1, 95% CI 1.2 – 3.8) more likely to answer word problems correctly in POST than PRE. Students' attitudes towards math did not change between PRE and POST, but a more positive attitude towards math increased the total number of correct responses (1.07, 1.03 – 1.12). More student enjoyment (2.54, 1.6 – 3.99) and motivation (1.67, 0.98 – 2.85) in math improved the number of correct responses. Pedagogical approaches combining science and math in an area of student interest could facilitate comprehension of both subjects.

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Oral

Trusting the Tech: Using Eye-Tracking as a Teaching Tool

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In the scholarship of teaching and learning, integrating technology in the classroom is a long-celebrated endeavor. However, in our zest to chase innovation, we sometimes neglect holistic input from the learners. Eye-tracking technology is an innovative biometric approach to track behaviors and responses to visual stimuli. We sought learner-input to determine if using eye-tracking as a teaching tool enhanced learning in an agricultural photography course. We used Tobii X2-60 eye-tracking hardware to document consumers' attention behavior as they viewed photographs created by students in the course. Then, we used visualizations created by the data collected from eye-tracking to show students how people saw their images. An outside researcher conducted a focus group with students (n=15) to make meaning of how they viewed the technology integration. We used constant comparative, open coding method and identified three primary emergent themes: 1) eye-tracking data provided tangible evidence of concepts taught in class and increased trustworthiness of the course and instructor, 2) student confidence in their ability to create visual communication increased and students articulated a desire to see the tool used in other courses, and 3) students wanted additional opportunities to interact with the technology. We concluded that eye-tracking was a valuable technology addition, enhancing student efficacy, student competency, and teacher trustworthiness. We recommend instructors of courses with visual components explore uses of eye-tracking, and that instructors who integrate technology into courses seek systematic input to monitor the engagement and effectiveness of technology implementation.

Cultivate ACCESS: Empowering Students to Pursue agSTEM through Mentor Relationships

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Women and minorities are underrepresented in STEM-related agriculture (agSTEM) fields. To increase participation of women and underrepresented minorities from rural Nebraska in agSTEM careers, a holistic mentoring and development program called Cultivate ACCESS (Agricultural Career Communities to Empower Students in STEM). The program was deployed in the fall of 2018 and designed to highlight a range of STEM careers in agriculture while developing employability skills identified by industry. A total of 22 high school students (scholars) from 15 rural communities from Nebraska were selected to participate in the 2018–2019 program. Scholars were paired with one of 12 career professionals (mentors) representing multiple disciplines. To facilitate mentoring interactions between high school students and mentors, 4 undergraduate students (ambassadors) were connected virtually and in person with scholars and mentors. Virtual training provided to career professionals equipped them with the skills necessary of effective mentoring. Ambassadors received training in mentoring, leadership, and use of social media, by enrolling in an experiential learning course. High school youth received virtual and face-to-face mentoring and completed bi-weekly journal entries to document the mentoring experience. A website was developed to serve as a source of information on the program and agSTEM careers. Outcomes indicated by journal entries are increased understanding and awareness of agSTEM careers, self-efficacy, and employability skills including teamwork, communication, and leadership. Mentors and ambassadors increased leadership and mentoring skills throughout their experience mentoring high school youth.

Fostering New Graduate's Workplace Persistence: Findings from APLU's National Survey

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Employers are voicing rising concerns with new generations of university graduates' ability to persist in the workplace. In a national survey (conducted by Crawford and Fink), employers, faculty, students and alumni shared their thoughts on how to make students more persistent. Responses varied across simple course suggestions to radical curricular change as well as challenging if this can, or should, be addressed at the university level. The open-ended question received over 5,000 responses (305 pages of text). The qualitative data was coded in Nvivo to mine for themes and rich description of how to foster success for new graduates. The codebook themes were generated through a reiterative and generative process with the key researchers and a consulting group representing skills in education, organizational psychology, communications, qualitative analysis, and institutional assessment. Fifteen themes derived from the data include: 1) seeking clarifying information, 2) evolution of decision-making skills, 3) dealing with conflict, 4) knowledge evolution, 5) independent thinking processes, 6) coping mechanisms, 7) individual character qualities, 8) relationships, 9) transitions, 10) orientation to the workplace, 11) experiences, 12) negative perceptions - educational systems, 13) negative perceptions - new employees and students, 14) negative perceptions – employers, and 15) cannot be taught in university. The themes represent perspectives from each stakeholder group (employer, faculty, student, alumni) and potential ways to connect the findings with curricular delivery and change are explored.

An Innovative Approach to Developing an Educational Communications Campaign in Agritourism

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Demographic changes and evolution of media consumption by those in the agricultural sector and communities requires new strategies for communicating information. To meet this challenge, educators must integrate traditional delivery methods with innovative, modern methods, and persistently measure the effectiveness of those methods. We developed an integrative educational campaign to reach prospective and emerging agritourism operators. The educational platform consists of a series of podcasts, with each episode focusing on a different facet of agritourism including production, management, marketing, and economics. Each episode is a narrative that interweaves interviews with current and prospective agritourism operators to discuss their challenges and questions, and recommendations for overcoming these challenges by industry experts, researchers and Extension professionals, and experienced agritourism operators from nearby states. This communication approach seeks to engage groups of younger, potentially economically disadvantaged producers who are most likely to begin an agritourism business but are also more challenging to reach with more traditional educational efforts. Furthermore, this approach allows for non-academic audiences to acquire much more in-depth and detailed information per unit of effort relative to traditional communication approaches (e.g., listening to a conversation versus reading an educational bulletin). The presentation will provide insights about motivations for this project, tools for recording podcast content, techniques for post-processing such as machine-learning transcription methods, and approaches for quantifying user interaction with the material. Time will be allocated for audience discussion of other strategies to increase stakeholder engagement per unit of effort and developing quantitative approaches for assessing outreach education impacts.

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Poster

Assessment on the Go

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Our profession has long focused on evaluation, wherein we judge quality of teaching. This evaluation often includes formal means such as student ratings of instruction and peer review. Less actively employed is assessment, designed to improve quality of teaching. Assessment tools employed during the term help us assess how we are teaching, how students are learning, if students are present in the moment, student interest in the content and their understanding of its relevance to their academic and non-academic life, and higher levels of learning such as ability to directly apply the material to an external problem. Selection of assessment techniques should consider fit with instructor assessment objectives, use of multiple measures, embedding assessment techniques into the ongoing lesson, and interpreting and judging the validity of assessment measures. Emphasis is on the concept that assessment is telling a story that we need to hear. Presented assessment techniques are designed to be quickly employed in the classroom such as the minute paper, pro and con grids, student development of exam questions, class opinion polls, and chain notes.

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Oral

Using iPads to Enhance Education Abroad Learning

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The Ohio State University has entered an agreement with Apple called the “Digital Flagship” in which all incoming freshmen are issued an iPad. The application of using iPads to support the course content of

Education Abroad programs, with and without Wi-Fi, are endless. Dr. Kelly George and Dr. Kelly Newlon piloted the use of iPads on a 17-day education abroad experience in South Africa. The objective of the study was to determine the student perception of the use of iPads on Education Abroad. The study design included a control group of 9 students who were not provided iPads and a treatment group of 9 students who were provided iPads with the program readings and a proximity-based chat feature. Both groups were required to complete journal readings, take two exams, submit reflective journals and participate in nightly reflection meetings. The control group used traditional hard copy, paper and pencil techniques. The treatment group utilized their iPads for all educational functions including exams and prompted journal submissions (airdropping notes back and forth with the instructor) as well as photos sharing and referencing the journal articles for reflection. The results of a post program survey of the two groups indicate increased engagement with the course material and an enhanced learning experience. As a result, a workbook for the program is being created for future years that will not need Wi-Fi for assignment submission. Kolb's Experiential Learning Theory was utilized for the course design and ideas for enhanced learning.

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Oral

The Personal and Professional Development Benefits of Being an Undergraduate Peer Mentor

Sarah Orban*, Jennifer M. Bundy and Michael Retallick
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Peer mentors assist first-semester undergraduate students with overcoming the typical barriers that occur at the beginning of their college experience. While previous research has shown that peer mentor programs are very beneficial, little is known about the effects the mentoring experience has on the peer mentors. The purpose of this study was to explore the effects of peer mentoring on the student mentors. This study had three objectives: 1) determine the benefits of the peer mentor program, 2) explain the professional growth, and 3) describe the personal growth that resulted from being a peer mentor. A group of 37 peer mentors in the Department of Animal Science were selected to participate in four focus groups, consisting of 6-8 peer mentors in each group, during the fall 2018 semester. The results showed that the peer mentors gained leadership skills, self-confidence, and career skills such as interviewing techniques and time management after completing the peer mentor program. This study provided the Department of Animal Science and the College of Agriculture and Life Sciences an understanding of the importance and impact of this program in the agriculture field. Serving as a peer mentor is as impactful for the mentors as it is for the mentees.

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Poster

Pedagogical Design and Delivery for Undergraduate Learning in Weed Science

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Student learning spaces represent the practical applications of our academic research and should reflect the implications and recommendations our scholarly contributions. The focus of this mixed-method study investigated lecture and laboratory instructional delivery models influencing student learning experiences for weed identification. Framed using Dale's Cone of Experience and structured using independent measures design two undergraduate groups participated in this study: the control group was provided direct instruction during classroom lecture (slide identification, discussion, and lecture) for weed identification. The treatment group was provided practicum using on-site field-based instruction (visual identification, on-site in vegetable plots, and natural habitat). Participants described their learning environment (control and treatment) and were randomly selected for transcribed interviews to provide voice to the quantitative data using parameters established by Strauss and Corbin (1990). The population for this study consisted of twenty-three undergraduate (N=23) horticulture majors enrolled in the Sustainable Vegetable Crop Production course at Auburn University in spring of 2019. The purpose of this study was to determine if a significant difference existed between student performance within weed identification practices using classroom and laboratory instructional delivery methods. Two research objectives framed this study: 1) quantitatively report participant's experiential learning preferences related to instructional

learning environment and 2) report observed differences between levels of achievement in the control and treatment group.

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Poster

Connecting STEM and Food Safety Through an Agricultural Biotechnology Program

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STEM education in agriculture holds significant potential to engage learners in developing solutions to real-world challenges; one such challenge in the agricultural system is food safety. To address the gap between educational opportunities in this growing field and local industry needs, we leveraged grant resources and existing local resources to establish new cooperative linkages between a secondary school, two-year postsecondary institution, and agriculture industry partners in Carroll County, Virginia. A primary objective was to create new educational opportunities in the area of agricultural food safety for students at the high school level. Through this project, we have developed a model to embed food safety across three consecutive agricultural biotechnology courses. This model balances introduction of new universally applicable biotechnology concepts while shifting to a student-centered classroom. The revision of an agricultural biotechnology course led to increased utilization of a STEM Lab for Agriculture and lessons that employ a food safety context for standard biotechnology concepts. A semester long student-centered capstone project has been implemented in the final course in the sequence. Students presented their projects in front of classmates, administration and local leaders in the agriculture field. Students are given the option of a three-day intersession where they can participate in field trips to interact with local food safety and agriculture industry professionals. This project was supported by the Secondary Education, Two-Year Postsecondary Education, and Agriculture in the K-12 Classroom (SPECA) Program of the National Institute of Food and Agriculture, USDA, Grant #2016-38414-25825.

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Poster

Agricultural Internships: Reflections and Attitudes from Undergraduate Students

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The purpose of this qualitative study was to explore the reflections and attitudes of undergraduate students who completed an agricultural internship in order to gain useful insights about internship elements, programming, and student learning. Specific research questions were: How do student internship completers describe their agricultural internship experience? And what characteristics of the internship experience do internship completers find to be helpful or restrictive in the learning process? The need exists to document the internship experiences of agriculture majors in hopes to clearly understand how internship programming aligns with the agricultural industry needs and student expectations regarding their experience. A three-pronged data collection approach was employed using a descriptive Likert-type survey, semi-structured one-on-one interviews, and document analysis. This study established a foundation of student attitudes toward their learning attained through an internship experience. Overall, student interns valued their professional internship experience while acknowledging the personal and professional benefits gained through completing the experience. Participants also discussed characteristics of their internship that could be improved to maximize the overall learning experience. The results revealed six major themes: previous experiences, hands-on learning, independent skill development, decision making, learning incentives, feedback, and personal goals. The focus on reflections and attitudes of agriculture undergraduate student's experiences in a qualitative approach had not yet been explored, thus providing a unique and new perspective. Results from this study can provide valuable

guidance to future programmatic approaches on guidelines and parameters of future internships. Internship coordinators might want to consider these findings when re-structuring internship programs.

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Oral

Engaging Students in Risk Management Assessment in a College Garden

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Morningside College recently established a student-managed garden, which provides students with an educational experience related to food production. As part of the Garden-to-Table Experience, the campus cafeteria uses the produce that students grow. After the first year of production, students in the Marketing and Risk Management course identified different risks faced by the campus garden, assessed them, selected the most pressing risks to be addressed in the next growing season, and recommended mitigation strategies associated with each selected risk. After students visited the garden in small groups and interviewed the garden manager and cafeteria chef, they selected two pressing production and consumption risks. Each group then reviewed scientific articles that discussed the source of risks selected by the group. At the end of the project, students were able to identify obvious risks including pests and predators, sanitation and safety, and soil management. Students were surprised to find other risks that were unknown to them including pet control, washing and handling of the produce at the garden and at the cafeteria, liability for food poisoning, and lack of consumer knowledge of the produce. After completion of the project, students understood the importance of assessing risks associated with the production and consumption of garden produce. More importantly, students with limited knowledge of agriculture found this project very informative as they learned the basic knowledge of food production and safety. Students suggested to keep the garden project and recommended a future assignment on how to brand garden produce to further enhance consumer's knowledge.

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Poster

Building Capacity for School-Based Agriculture Education in Michigan's Upper Peninsula

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The Upper Peninsula (U.P.) of Michigan has a rich culture rooted in agriculture and natural resources; yet there is only two state recognized school-based Agriculture, Food and Natural Resource Education (AFNRE) programs in an area that comprises one third of the landmass of Michigan. As public awareness of agriculture and food systems grows, so has interest in establishing programs within schools to prepare students for career opportunities in these fields. Student interest in making agriculture and food systems central to their experience and future career path has been evidenced by the popularity of innovative non-formal agriculture education carried out by teachers who see the connections between agriculture and STEM. Michigan State University's experiment station in the Upper Peninsula developed hands-on educational opportunities for secondary educators, offered mini-grants, and specific curriculum to integrate agriculture and food systems into their teaching, leveraging existing agricultural infrastructure such as school gardens and hoop houses. An extension of the teacher training is a novel platform for peer mentorship: an online, searchable map of educators engaged in agriculture education who are willing to mentor other teachers. This inventory of existing school programs and local resources provided justification for a new Institute of Agriculture Technology program, offering new access for students who have engaged in non-formal agriculture education at the high school level to complete higher education in agriculture. The resources developed for this program offer teachers who might otherwise not know about formal agriculture education exposure to the benefits of state recognized AFNRE programs.

Preparing the Agricultural Workforce: An Innovative Internship Program

Alyssa Degreenia, Erin Meachum and Elizabeth Wilson
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An innovative internship program has been redesigned and standardized for all students completing their Associate of Applied Science degree at NC State University. There are two course components to the program, AGI 191: Professional Development and AGI 192: External Learning Experience. Over the past three years since the redesign, students have completed over 330 total credit hours and 39,600 working hours, with 97% paid internships and over 150 employers in the database. The AGI 191 course is grounded in national research that focuses on employability skills necessary for new graduates. Additionally, a partnership with the Agromedicine Institute was developed to teach safety in the workplace. AGI 191 incorporates discussion, case studies, and videos of employers and past students that serve as instructional scaffolding. Technology has helped to grow the program through the creation of an internship database and manual for AGI students, faculty, and employers that covers every step of the internship. Employers post positions and hire students; students and employers complete the MOA/growth plan and students' hours are automatically calculated. In addition, employers are able to use a likert scale to evaluate and assign grades to their interns in mid-point and final evaluations. Faculty and students also evaluate the experience. Follow-up interviews with employers have been conducted and the needs of the community have been used to modify AGI 191 instruction. This robust program puts research into practice to benefit students, educators, and employers through community engagement to prepare the future agricultural workforce.

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Poster

Focusing on Safety in the Agricultural Workforce

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The North Carolina Agromedicine Institute (AI) and the Agricultural Institute (AGI) at North Carolina State University have co-developed an educational approach that ultimately helps to improve the safety of agricultural workplaces. The AI is a partnership among East Carolina, NC State and NC A&T State Universities. The AGI has created an internship program in which students take a Professional Development course before they complete their internship. Agromedicine is incorporated in the course through guest lecturers, videos and workshops hosted by the Agromedicine staff. Students learn about different techniques to help them maintain a safe environment as well as how to maintain high standards of safety for all involved. From 2016-2018 over 160 students have completed the course and an additional 130 student's will in 2019. The agromedicine component has allowed for students to take this knowledge to employers across North Carolina and the country. The students that have completed the internship program were surveyed to see if their agromedicine knowledge was utilized, if they used the agromedicine kits (safety glasses, ear plugs, farm plans, etc.), how likely they were to use it again, and if they shared it with their employers. The data was then qualitatively evaluated and applied to the agromedicine instruction. This collaboration has allowed for students, faculty, and employers to benefit and create a safer agricultural workforce for current companies and for companies in the future.

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Oral

SeeBeefGenetics: Evaluation of Optimized Feedback in a Beef Cattle Breeding Simulation

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The purpose of this study was to determine the effectiveness of optimized feedback in a beef cattle breeding simulation. Previous research has shown that without feedback students are often unable to make sense of their results. To overcome this, we designed dynamic, progress-based feedback for the simulation featuring a built-in game guide, Vince. Feedback was optimized using a four-iteration approach. In the most recent iteration, students (n=242) were asked to complete a 20-question multiple choice pretest, one scenario of SeeBeefGenetics®, reflection questions, a 20-question post-test and a brief survey (IRB #2012193). Within the scenario, they were assigned to one of two feedback types: Static or Interactive. In the Static model, Vince states the feedback for the student to read then they proceed. In the Interactive model, Vince poses the feedback as a question which the student must answer before moving on in the simulation. To analyze learning outcomes, we broke students into four learner categories: High Performers, Moderate-High Performers, Moderate-Low Performers, and Low Performers based on pretest score. We observed improvements in score for both Moderate-High Performers (P=0.07) and Low Performers (P=0.06). We found no difference in score for High Performers which was expected based upon the literature. We also observed no difference in score for Moderate-Low Performers which we contribute to the feedback design not properly driving students to overcome misconceptions. This study indicates the importance of considering learner type when evaluating learning tools. It also provides valuable information for further refinement of the simulation.

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Poster

How Peer Mentorship Strengthens the Connection between Social Science Research and STEM

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Peer mentoring can be a tool to assist entry-level students in connecting social science research methodologies to STEM and encourages learner-centeredness and increased student engagement. In previous semesters of an Introduction to Agricultural Communications and Leadership course, entry-level undergraduate students received a lecture about social science evaluation and developed a research project addressing a need or campaign. This approach typically resulted in low investment from the students and inadequate project development. In the fall 2018 semester, the instructor recruited two graduate students, who had completed or were enrolled in a graduate-level research methods course, to a new teaching approach for this undergraduate research project. The mentors presented an introductory lecture on evaluation methodology, and students were assigned groups based on concentration area and class performance to develop their research projects. The mentors and instructor answered project development questions, assisted with objectives, and reviewed instrument drafts. The entry-level students then implemented the revisions and present their projects. The instructor and graduate students evaluated the presentations and gave feedback for the overall project. The instructor noted significant improvement in the quality of instruments and students demonstrated increased understanding of quantitative and qualitative methods in comparison to previous years. Supporting the results from other peer mentor studies, both mentors and mentees found value in the experience. Quotations describing the experience from student, mentor, and instructor perspectives will be presented. Peer mentorship enhanced student understanding of research methodology, strengthening student's connections between social science research and STEM.

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Poster

Women with Engines: Connecting Students and Communities

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Engaging students in authentic, real-world experiences, provides learners with an opportunity to cultivate deeper understanding of content and its application. Utilizing community-based learning, integrating community service with academic study, the Agricultural Education program at the University of Kentucky created a learning experience for both undergraduate students and community members through small gas engine (SGE) operation and repair. An idea generated by an instructor, designed and facilitated by

students, and meeting the needs of a community, “Women with Engines” was created. “Women with Engines”, an outreach event, targeted women of the community who had little to no knowledge of small engine maintenance, operation, or repair and seeking to gain some understanding and experience. Nineteen pre-service teachers and 3 students from other majors, enrolled in TSM 220: Internal Combustion Engines, facilitated the workshop. Student pairs taught sessions that included: changing engine oil, servicing ignition systems/air cleaners/fuel systems, engine maintenance/troubleshooting, and general operation. Thirty-three women registered for the event. Students expressed increased confidence in knowledge of SGE and increased comfort in teaching the material. Participants stated their participation was driven by their desire to increase their skill set. All participants had one or more small gas engines at their home residence; understood the purpose and use of their small gas engine(s) but did not feel that they had a strong understanding of how to properly maintain their engine. However, after participating in this event all the women expressed that their knowledge and understanding level was increased and were eager to apply the new knowledge.

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Oral

Cultural Leadership and Exploration for Scholars

Chanda Elbert
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Cultural leadership and exploration for scholars was created to gain an interdisciplinary approach to cultural leadership, understanding, and awareness for university students. Many times, students develop their personal viewpoint and experiences from their homes, family members and communities. Although, these viewpoints are relevant, at times, these assumptions and interpretations of others are generally used to screen those that are outside of their immediate culture. Through readings, class lectures, films, group projects, and discussions students are taught about various social theories and historical perspectives of leadership, particularly in terms of class, gender, race, ethnicity, and nationality. This course takes a multidisciplinary approach to the study of leadership with a special emphasis on culture. The instructors have been teaching this course out of the College of Agricultural and Life Sciences and has partnered with the Department of Multicultural Services for over ten years. The instructor will share several culturally relevant interdisciplinary learning co-curricular activities along with a content analysis of reflections from students throughout the semester.

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Oral

Mixing it Up: Ideas to Differentiate Writing Assignments

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Students like to learn in very individualized ways. Some students may prefer to produce a written essay while others would rather create a diagram or provide a verbal explanation. The incorporation of differentiated instruction encourages teachers to utilize strategies for a variety of learning profiles. This approach helps to meet the diverse learning needs of students while also encouraging them to think critically. The instructors of an introductory level course differentiated an assignment to allow students five different options to convey the content that traditionally would have been communicated in a standard written format. In lieu of a traditional written format, students could submit a letter to an influential mentor, prepare a three-minute-long elevator speech, create a visual representation, create a graphic organizer, or conduct a review of relevant research. This presentation provides more specific details of the assignment options that were provided, suggestions for additional options, examples of student work, advice for implementation, and ideas to adapt the assignment options for other disciplines.

connect | develop | achieve

Making Connections: Agriculture STEM Programs in the FAEIS Survey

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Identifying and tracking STEM programs in agriculture in terms of national enrollment, degrees awarded, and placement is important for policy makers judging the gap between students graduating with STEM degrees and expansion of workforce capacity on scientific frontiers, new products, and technological progress in our nation's agriculture industry. The Food and Agricultural Education Information System (FAEIS) surveys and collates data related to enrollment, degrees awarded, and placement labeled under the accredited Classification of Instructional Program (CIP) code from approximate 230 academic institutions. The data is utilized by USDA, lobbyists and professional organizations. This case study explores enrollment trends in agriculture CIPS that fall under the STEM classification as designated by the National Science Foundation and how the FAEIS system can help track STEM programs in agriculture. We examined 140 institutions with agriculture colleges or departments that have programs that match the NSF classification. The FAEIS dataset is used to compare measures between 23 of these STEM and 40 non-STEM programs in the 01 (Agriculture) CIP range. Data is presented in the contexts of served demographics, institute type, and institutional structure. A 60/40 male to female gender ratio is observed in agricultural STEMs while the inverse is true of non-STEM agricultural programs. Agriculture STEM programs make up more than 60% of agriculture enrollment at land grant universities. These results illustrate how FAEIS data can provide a strong argument for the interconnectedness of agriculture and STEM.

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Tiffany Morey and Daniel Foster
The Pennsylvania State University, University Park, PA

Mentoring has long been a part of successful educational programs regardless of discipline to help students navigate from classes to careers. Successful mentoring relationships are built around the tenants of role modeling, nurturing, and caring, with mentors and mentees engaging in experiences that promote teaching, sponsorship, encouragement, counseling, and friendship. The Pennsylvania State University (PSU) Agricultural and Extension Education Program sought to capitalize on mentoring relationships through a mentor team approach for their teacher candidates utilizing multiple digital communication platforms. The mentor team effort was piloted in 2017-2018 and has quickly becoming a staple of the capstone year of the program. Mentor teams include the traditional triad of teacher candidate, cooperating teacher, and university supervisor, but also include a virtual team of a recent program graduate, an out-of-state thought leader of the profession and an in-state member of the profession not currently serving as a cooperating teacher. With geographically dispersed volunteers who have varying levels of digital fluency, open communication with program leaders was critical. Program leaders purposefully engaged with volunteers throughout the mentoring process to identify best practices in virtual mentoring that can be applied to any discipline. Volunteers highlighted opportunities to give back, establishing early professional connections, and offering an additional connection to student teachers as integral to their desire to participate. In addition, virtual mentors discussed various methods as essential to building and maintaining relationships with their virtual mentee. Mentors identified Twitter, care packages, and weekly check-ins as some of their key strategies of successful mentorship.

The Morey Moment: “Learning by Doing” with Digital Assessment

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We live in a digital world with digital fluency becoming a necessary survival skill for graduates in any discipline. With the creation of many free and easy-to-use internet-based tools, students can quickly become overwhelmed. In particular, teacher candidates (or post-secondary instructors) who are seeking online assessment tools have a plethora of choices when it comes to choosing alternative or innovative methods for formative and summative assessment. Incorporating examples of new forms of technology into learning activities at the post-secondary level due to time, technology, and digital fluency constraints can be challenging. The teaching methods course at The Pennsylvania State University purposefully replaced traditional assigned reading assessment with an interactive, technology moment called, “The Morey Moment” on a weekly basis. The use of individual digital devices had been encouraged in the methods course but had not been used for weekly assessments of reading material. Students were provided with a short screencast/video and a quick-glance best practices card for each new technology platform prior to using it for their assessment. The students’ weekly assessment was conducted with the assigned platform of the week, allowing them to experience “learning by doing” as they demonstrated their knowledge of what they had learned each week. The Morey Moment increased the digital fluency of students by exposing them new forms of technology, introduced alternative forms of digital assessment, and turned five minutes of paper-and-pencil based assessment into five minutes of engaging practice with new forms of technology.

Factors Affecting Student Performance in Agricultural Finance Courses

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Many empirical studies have investigated the main factors affecting the performance of students in different courses. Most were in business and economics fields, with a few looking in finance. The significant factors are not the same in different studies. In some studies, both age and gender were highly significant, while in others these factors were insignificant. Some researchers found a high correlation between the students’ performance in finance courses and their grades in math, statistics, and similar courses, while other researchers claimed that students’ performance in other courses is irrelevant. The objective of this study was to investigate factors affecting student performance in agricultural finance courses (AGBU 2389 & AGBU3367) at Sam Houston State University. We analyzed a sample of 1504 students (928 female, 576 male), enrolled from 2000-2018. In comparison to other studies in this area, we use a larger sample size and study a much longer time period. This reduces the time sensitivity and increases the reliability of our results, mainly in the specific geographic area of our concern. We used multiple linear regression analysis to identify the factors which significantly explain the variations. In order to investigate factors associated with student performance in agricultural finance courses, eight variables likely to have an impact on student performance were selected. The significant variables that resulted from the model included cumulative GPA, major and minor fields of study, age, and students’ grades in math and statistics courses. The results indicated that gender is not significantly correlated with student performance.

Industry Expectations for New Graduate Agricultural Lenders

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Lenders attending one of the four 2018 North Dakota Annual Outlook Conferences were surveyed to improve our understanding of their job and of characteristics valued in graduates entering the field of

agricultural lending. Lenders reported spending most of their time managing loans (21%), recruiting customers (20), doing paperwork (15), and determining loan eligibility (14). Regarding new hires, the average loan officer will consider a candidate with a grade point average of at least 2.85. Lenders believe on-the-job training is slightly more important than that curricular, but we found no difference in assigned importance between financial and non-financial skills. Lenders reported oral and teamwork skills to be more important than general financial knowledge, analytical skills, and written communication. Financial concepts considered important were financial statements, break-even analysis, accrual accounting, and ratio analysis. In agreement with the literature, time value of money was not considered important, although many introductory agricultural finance courses in the area including our own, continue to emphasize it. The most important non-financial skill was identified to be communication. Other important abilities include those in risk assessment, leadership, software, whole farm budgeting, and sales. Analysis continues on the data and curricular recommendations.

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Poster

Modeling Metacognitive Processes through Self-Directed Learning

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As instructors, our primary goal is to educate students and promote learning and critical thinking. How then do teachers encourage students to take charge of their learning? One solution is metacognition and the concept of self-directed learning. Metacognition, a form of reflection, is an area in which students receive little training, possibly leading to challenges with independent work. Instructors can utilize the cycle of self-directed learning (SDL) to teach students how to monitor and control their own learning, as well apply the metacognitive skill. The cycle of SDL highlights five processes: assessing the task, evaluating strengths and weaknesses, planning, applying strategies and monitoring performance, and reflecting and adjusting. There are two strategies on how to model metacognitive processes for students, talk out loud and prompts. These strategies work well when introducing a skill or task that a student is asked to complete independently. When introducing the talk out loud strategy, the instructor might use the idea of planning a specific task to model the practice on how to model the cycle. After that exercise, select another task and provide prompts to the participants based on each step of the cycle, for instance, asking "how would you begin?" These prompts allow students to apply what the teacher have just modeled for them. We have used this strategy for modeling how to plan lessons and organizing a course paper. Modeling the processes allows instructors to be explicit about their expectations, avoid assumptions about what students can do, and serves as a formative assessment.

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Oral

Humor in the Classroom

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Humor in the classroom has been researched and advocated in many disciplines. Benefits are that it improves attendance, helps capture and retain student interest, deepens the instructor - student relationship, reduces student anxiety, and can improve learning. Just as is true for delivering a joke or sharing a humorous story outside of the classroom, use of humor in teaching has its risks. Our sense of humor may not be consistent with that of most of our students, for example, or someone may take offense regardless of how carefully we consider content of our lecture. We advocate the benefits can certainly outweigh the risks. The purpose of my presentation is to share the literature on use of humor in teaching using humor. The audience will enjoy a good joke, a funny story, use of an alternative persona, and create fun music.

Honors Directed Readings Course: Student Engagement, Discussion and Mentoring

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Purdue Agriculture offers “Directed Readings in Agriculture, Environment and Society” as a dual-level, independent study, interdisciplinary, 8-week, honors one-credit hour course with class sizes ranging from 6-12 students. This course is offered in the spring semester and is co-facilitated by instructors from Agriculture and University Libraries. The course models rational civic discourse and critical thinking skills to be engaged and informed scientists and citizens. The readings revolve around popular contemporary books: “Denialism: How Irrational Thinking Harms the Planet and Threatens Our Lives” (2010, Michael Specter); “Quiet: The Power of Introverts in a World that Can’t Stop Talking” (2012; Susan Cain); and “Unnaturally Delicious: How Science and Technology Are Serving Up Super Foods to Save the World” (2016, Jayson Lusk). Learning objectives include: 1) Develop an understanding of the importance of critical reading; 2) Develop the ability to lead a small group and engage peers in discussions utilizing prepared questions and prompts; 3) Clearly articulate position and/or justify and defend stance amongst one’s peers; 4) Learn how to incorporate reflection into reading; and 5) Develop strategies to discover reliable information to improve one’s understanding of course material and selection of a literacy contribution. Assessment of student performance involved: weekly instructor and peer evaluation of discussion contributions; class facilitation and presentation of supplemental literacy contribution including discussion questions; and written reflection assignments of understanding how to lead small groups and perceived effectiveness of leading the group discussion. The course has proven to be an effective and enjoyable educational experience as determined by course evaluations and student testimonials.

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Poster

Problem Solving Styles of Academic Research Teams: A Pilot Study

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Effective and efficient teams include individuals with varying problem-solving tendencies on the adaptiveness to innovativeness continuum, determined using the Kirton Adaption-Innovation Inventory (KAI), a 33-item instrument. Although this tool has been used extensively in business organizations, little work has explored problem-solving tendencies of academic research teams. The aim of this study was to determine if, within academic research teams, there is a diversity of adaptive and innovative problem-solving styles. Research faculty, graduate students, and post-doctoral associates of one academic department in a College of Agriculture and Life Sciences took part in the study. Of the 34 participants who were consented, 25 from nine research groups completed the KAI. Respondents were split between adaptive, scores ranging from 45 to 95 (n=15), and innovative, scores ranging from 96 to 145 (n=10). Ten participants demonstrated “bridging” scores (91 to 109) between the problem-solving tendencies. Only one team exhibited a homogenous tendency (adaptive) and for one team, there was a single respondent. Scores ranged from 65 to 115 suggesting that very strong preferences for adaptive or innovative problem-solving tendencies were not evident in these academic research teams. In conclusion, the cognitive diversity of the research teams may serve to enhance problem solving. Next steps, involving team-building activities to facilitate understanding of problem-solving tendencies and strategies for fostering highly effective and efficient teams, should be undertaken.

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Oral

Differing Structures: Examples of Faculty Learning Communities in a University Setting

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In Fall 2018, seven faculty learning communities were simultaneously formed at Penn State University. The objective of these communities was to drive innovation, facilitate faculty development, promote the scholarship of teaching and learning, and to inspire excellence in teaching and learning. The faculty learning community themes were proposed by the faculty themselves, with the idea of bringing together faculty to explore a shared idea, concept or interest area that supports an active learning environment. Secondary goals included actively promoting collegiality and community development within the university teaching community. This study comprises an analysis of how the seven faculty learning communities self-organized under similar conditions and progressed toward the goals they set for themselves. The faculty learning communities share several factors in common including all began with a small amount of funding, every community had at least four participants, all faculty leaders had to attend an orientation and write a summary report at the end of the academic year. Despite these similarities, variation in faculty learning communities varied in the number and composition of participants, the topics addressed, methods of sharing information among members and the ultimate goals. Participants in this session will gain theoretical and practical insights relevant to the organization and differing structures of faculty learning communities in university settings.

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Oral

Introducing the Academic Discipline of Agricultural Communications to the United Kingdom

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The profession of agricultural communications has existed for decades in the United Kingdom; however, unlike in the United States, the U.K. has no related academic discipline in its higher education system. Agricultural journalists, for example, are typically either trained academically in journalism and then gain their agricultural knowledge on the job, or vice-versa. There is need to identify and describe opinions of prospective employers and agricultural students about the prospects of developing an agricultural communications academic discipline in the U.K. An understanding of the competency's employers would expect of agricultural communications graduates, as well as an understanding of what students would expect to learn and what faculty would expect to teach, would inform the conceptualization and potential development of the discipline in the U.K. The populations in this study included 200 members of the British Guild of Agricultural Journalists and 1,525 students at two UK agricultural colleges. Twenty-two agricultural communications professionals and 67 agricultural students responded to a survey about agricultural communications curriculum, skills, and competencies. Both groups thought many of the competencies taught in U.S. agricultural communications programs—such as public relations, writing, and crisis communication skills—would be important for agricultural communications graduates in the United Kingdom. Further, understanding agricultural issues and policies was also agreed upon as an important skill for agricultural communications students to have upon graduation. As the dialogue about establishing agricultural communications curricula in the United Kingdom continues, it should be driven by data as well as by practical advice from industry and academia.

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Oral

For the Students, By the Students: Generating Scholarship Funds through Club Activities

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As traditional funding models decline, student clubs are a way to generate significant funding and industry attention. Club advising can be viewed as an added obligation to a professor's already busy workload, but it can also be one of the most rewarding experiences for a faculty member, as well as for the students. We showcase unique ways student club activities can foster increased student engagement. At Cal Poly, the Agribusiness Management Club has developed an exceptional learn-by-doing; learn-by-leading club model, with the help of an advisor who takes a supportive, not supervisory approach. The club's scholarship fund has grown from \$5,000 in 2015 to over \$30,000 in 2019. The scholarship fund is disbursed by senior-level students; and the primary criteria (after a minimum GPA is met) is how much time and effort the applicant

has contributed to the club's activities. The possibility of the scholarships motivates student involvement and encourages success and cooperation in implementing activities. In addition, the club pays for its own trips to industry tours and trade shows; all activities are student-planned and led. The club had one industry-sponsored meeting in 2017-2018 and grew to six industry-sponsored club meetings for 2018-2019, with a waiting list started for 2019-2020. The club's budget exceeds \$100,000 annually. We share ideas for creating and supporting successful student club activities with substantial student engagement and industry support.

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Poster

Bugs for Every STEM: Insects as Models for Hands-on Learning in Agriculture

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Insects and other arthropods impact nearly every aspect of our lives. Because of their relevance to agriculture and society, insects can be used effectively as learning objects designed to help students learn pivotal concepts in science, technology, engineering, and/or mathematics (STEM) related to agricultural systems. A laboratory course at the University of Arkansas that accompanies the introductory, non-majors lecture, Insects, Science and Society, has used entomological concepts to engage students and aid in concept retention. The laboratory class uses hands-on entomological examples to connect STEM concepts across multiple agricultural related disciplines including food science, environmental science, economics, and marketing. This is achieved by conveying pertinent aspects of arthropod diversity, societal influence, medical importance, ecological interaction, insect products and ecosystem services, and relating these aspects to the lives of students. Testing hypotheses, determining environmental quality, and studying organismal biology are easy with insects and arthropods, because they are often diverse, abundant, affordable and typically do not require permits for their use in the classroom. Over the past three years, students have self-reported on course final exams retaining STEM concepts that were learned during the lab from insect-related activities. Experiences relating to creating an insect collection and working with and sampling insect products were among the most recalled by students.

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Oral

Through the Looking Glass: Using 360 Video as a Global Learning Tool

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Costs. Schedules. Credits. Time. Fear. These are just a few of the many hurdles to providing students with a chance to experience agriculture in different corners of the globe. One practical way of overcoming these obstacles is utilizing technology already possessed by students: their smartphones and 360-degree videos. This conference session will discuss innovative teaching approaches to incorporate 360-degree videos to transport students to other regions of the globe. The medium provides a practical application that can allow students to see firsthand agricultural practices with some basic effort on the behalf of the professor. The session will provide qualitative data from students identifying the value and challenges of incorporating this technology. Additionally, participants will explore practical steps to incorporating 360-degree videos into classrooms on a wide variety of topics along with challenges and lessons learned by both the instructor and students. Session participants will also be able to experience a 360-degree video utilized in a classroom environment. By providing more opportunities to visually immerse students into different cultural and geographic settings, we will be able to work to enhance their learning and optimize our own teaching.

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Food Systems Thinker: Systems Thinking in the Context of Sustainable Food Systems

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Systems thinking is essential to investigate complex societal problems, but most education systems do not offer opportunities for students to learn or practice the skills. Studies found that people have limited knowledge and awareness of food, its social and economic significance, and its links to health and environmental quality. This project (USDA-NIFA#2016-38640-25381, NCR-SARE#GNC18-256) engaged experts in developing self-directed online educational resources for high school students to practice systems thinking, learn about sustainable food systems, and reflect on how food choices are related to the environment, economy, and community. Twelve lessons and five experiential learning guidelines were developed. Lessons consisted of readings, slideshows, audio, and videos addressing inputs, food production and distribution, health and well-being, environmental impacts, influences, and outputs in the food systems. Five educational videos were produced from interviews with farmers to present real-life examples regarding food systems-related issues. For example, biodiversity, seed saving, disruption of food transport, sustainable practices, labor injustice, local economic development, and power of consumers were discussed. The lessons fostered the practice of systems thinking through identifying components and relationships within a food system and with other systems, setting boundaries for systems analysis, considering different perspectives and variables, recognizing concepts of stock and flow, feedback, and leverage points, and understanding about delay and time horizon. Ten worksheets were developed to have learners demonstrate learning comprehension, application, and reflection on the lessons. The Food Systems Thinker project contributes to the need for educational resources that address sustainable food systems topics and promote systems thinking.

Building Global Engagement through Classroom Content

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A challenge often exists in the classroom where both students and professors want class content that is applicable and can actually “do something” for communities around the globe. But how do faculty practically build applied and relevant assignments into their course curriculum? This presentation explores two cases of innovative teaching approaches used to practically address global concerns related to agriculture and development: one class assignment to write grant proposals related to agricultural development in Kenya and the other requires students to identify an international agency or organization with which to partner to address a local need. This session will: 1) share the opportunities and challenges of incorporating such content and provide lessons learned in the process, 2) provide the connections built between content and theory, and 3) discuss pathways to build and foster community connections. Attendees will gain practical steps to incorporate applied, globally engaged assignments in the classroom. Qualitative and quantitative data from students and the partners will be shared to help contextualize the learning process for educators who might have an interest in using this technique in their classes. Providing more globally engaged assignments allows our students structured opportunities to use the skills they are learning to address real world problems outside of the university.

Collective Action and Collaborative Research: Supporting Agricultural Research and Development

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The formation of farmers' organizations of various types has grown in recent years to address research and policy needs, including organizations representing small farmers and a focus on poverty alleviation. Understanding how farmer groups and other institutions of collective action can address issues like market access, sustained agricultural growth, rural employment and farmer welfare can serve as a mechanism to support research and development. Farmers' associations are registered nonprofits in many nations, a means for farmers to come together to fill service or advocacy gaps that are not addressed by the public or for-profit sector. Farmer associations play key roles in agricultural change. Producer associations in the US often fund research through resources generated by their own members and interact directly with researchers in the land grant institutions, state agencies, and USDA. The goal of the Feed the Future Haiti Appui à la Recherche et au Développement Agricole project (AREA), led by the University of Florida, is to build the capacity of Haitian farmers to gain access to improved products and technology. The project assists Haitian researchers, professionals and institutions to modernize the country's agricultural sector, using a model of international collaboration between nonprofit organizations, land grant institutions, and agricultural professionals and students. It fosters cross-cultural exchanges between African, Haitian and US teams to prepare the next generation of farmers and agricultural professionals globally. Understanding how to assist farmer associations can improve agricultural projects and foreign aid investments in Haiti and provide a model for other developing contexts.

Assessing Students' Socially Responsible Leadership Skills

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The Social Change Model (SCM) of Leadership Development helps prepare future members of society by enhancing their socially responsible leadership skills. The SCM of Leadership Development strengthens purposeful, collaborative, value-driven leadership skills for students. Students can gain socially responsible leadership skills in study abroad and on-campus experiences. The purpose of this study was to determine students' self-perceived socially responsible leadership skills before and after study abroad or on-campus leadership experiences. The socially responsible leadership skills test was administered to students as a retrospective survey after study abroad or on-campus experiences. Respondents' socially responsible leadership skills were significantly enhanced following study abroad or on-campus experiences. Students' perceptions of consciousness of self, congruence, collaboration, common purpose, controversy with civility, citizenship, and change were higher after study abroad or on-campus participation. These results are likely because students were dependent on their pre-established beliefs when exposed to a new environment, such as a foreign country or a new campus. Significant differences existed for only one of the constructs in the social change model. "Commitment" showed decreased skill levels, perhaps because students were physically exposed to unfamiliar commitment scenarios and realized they had over-estimated their pre-experience commitment skill levels, resulting in decreased post-experience scores. Study abroad and on-campus leadership experiences help students practice the precepts of the SCM, empowering them to become social change agents and positive members of society.

CASNR Needs Survey of First- and Second-Year Students

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Grade reports for students in the College of Agricultural Sciences and Natural Resources (CASNR) 2017-2018 Freshmen-in-Transition cohort indicated that first year (freshmen) students with several college credits already completed had more difficulty with academic coursework in the spring semester of their first year relative to those in their cohort who brought in fewer credits. To determine how CASNR could help with this issue, we measured first and second year students (n=673) through use of a Needs Survey in the Fall of 2018. Students were asked to answer 32 questions on a 5-point Likert scale (strongly agree to strongly disagree). 85% of students responded to the survey (n=573). Select demographics of the respondents include: 74% female; 75% white; 6% Hispanic; 92% full time students. Regular class attendance, OSU's promotion of the use of support services, opportunities for social activities, or support for well-being had close to 90% of respondents agree or strongly agree. Time management, peer tutoring, and study skill questions had at least 70% of respondents agree or strongly agree. Respondents strongly or somewhat disagreed with I am satisfied merely passing classes (63%), acceptance of greater responsibility (47%), and needing help with setting goals (40%). Additional analyses will be conducted to determine if responses can be linked to number of credit hours brought to OSU as a freshman.

Influence of High Impact Experiences and Teamwork Skills in the Workplace

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In current job markets, practical experience and skills separate exceptional job-seeking candidates from the norm. Teamwork skills, commonly desired by employers, are known to help applicants gain a competitive edge in the job market; teamwork can be developed through high impact experiences (HIEs). Teamwork skills are refined through critical thinking, interpersonal communications, and intercultural activities while abroad. The purpose of this study was to determine how HIEs prepare students for the workplace. Students' (n=33) qualitative data from a 2019 Costa Rica HIE showed their ideas of teamwork remained fairly consistent with previous Costa Rica HIEs (2017-2018). Since 2017, pre-experience responses showed students (N = 85) perceived their teamwork skills as equal as or slightly better than their peers' skills. Post-experience data showed more conservative responses. The idea of effective teamwork post-experience was no longer defined by individual intelligence or accomplishment, but in the way, one conducted his/herself in relationship to others. Several respondents from all Costa Rica HIEs (2017-2019) cited interpersonal communication as key to developing teamwork skills and accomplishing goals. HIEs positively impacted students' teamwork skills through development of open mindedness and new ways of thinking and doing things. Students commented that immersion into an unfamiliar culture fostered a unique academic and cultural experience, leading to increased knowledge and tolerance for different cultures, which is a valuable trait in the workplace. Because global business is more culturally diverse and collaborative, universities should consider promoting HIEs that help students develop teamwork skills, and cultural and communicative competencies.

Techniques for Engaging Your Interdisciplinary STEM Graduate Students

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Effective engagement of graduate students in the classroom enables development of professional skills to excel in the sciences. The typical classroom environment falls short in areas of active learning and student

buy-in. This problem is further magnified in interdisciplinary classrooms as separation between interests and pursuits increases among students. To address this, we designed and implemented a new professional development course at the University of Nebraska-Lincoln for interdisciplinary Ph.D. students. Pedagogical techniques employed in this course included: think-pair-share, self-sorting, sequence-chain, minute-papers, gallery-walks, and jigsaw. One focus of this course that highlights these engagement techniques was recognizing and deconstructing aspects of the scientific writing process. Students were systematically exposed to aspects of scientific storytelling and asked to evaluate the effectiveness of stories in peer-reviewed manuscripts. Students collaboratively developed a rubric and were asked to identify parts of a scientific story that could be evaluated for quality in a think-pair-share format. After the initial development phase, students participated in a modified gallery walk on rubric sections, whereby small groups critiqued each section of the rubric before a full class discussion. Upon developing and using this analytical trait-based rubric on two different papers, students were provided a criterion-based performance list for comparison and participated in a gallery-walk by applying both rubrics to scientific posters. Students offered feedback on this activity using end-of-session minute papers and 100% of students self-identified rubric generation as a valuable experience. Overall, we demonstrate an effective method for engaging interdisciplinary STEM graduate students in the professional development classroom.

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Math Placement Exam Outcome Impacts on Quantitative Coursework in Agribusiness and Economics

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Previous studies have examined the factors that influence post-secondary success. A contingent of these have posited that success in gateway courses, specifically math courses, resulted in higher retention and graduation rates. Reports suggest that of successful graduates, 70% were successful in math courses early in their college path, based on both two- and four-year college students. Other research indicates that the success in a first-year math course is the second-best indicator of retention. Conversely, withdrawing from a course reduces the likelihood that college students will remain in school and graduate. Oklahoma State University (OSU), among others, employed a placement exam (ALEKS) for math and statistics courses starting in the 2012/13 academic year. Eligibility of students for math and statistics requires an ALEKS exam score exceeding specific thresholds. With regard to students in OSU's College of Agricultural Sciences and Natural Resources (CASNR), and more specifically those with an Agribusiness (AGBU)/Agricultural Economics (AGEC) major, entry-level math coursework is a prerequisite for Quantitative Methods in Agricultural Economics (Quant), a junior-level applied math and statistics course. Furthermore, this course is a prerequisite for future AGBU/AGEC coursework. This research used the outcome of the ALEKS, grades in entry-level math coursework, as well as demographic information for 335 CASNR majors (65.1% male, 34.9% female; 59.1% AGBU, 12.2% AGECE) to determine the effectiveness of the math placement exam in instilling similar success in Quant. Results indicate that the ALEKS exam does not provide a strong indicator of Quant success; however the regression coefficient is positive and statistically significant.

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Using Urban Farming Approach to Equip Youth in Entrepreneurship and Increase Supply of Fresh Fruits and Vegetables in Food Desert Community of Gary

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Urban areas with food deserts struggle to produce fresh fruits and vegetables to meet population needs. Providing urban farming and entrepreneurship skills to youth can increase the supply of vegetables and fruits and assist youth in exploring careers and determining their own futures. Gary, Indiana, designated as a food desert (USDA, 2015), is the target community where a unique partnership developed to support urban farmers grow and distribute fresh produce. Additionally, youth will learn entrepreneurial and urban

agriculture skill sets through focused workshops and summer farm internships. Local stakeholders, including City of Gary, Gary Food Council, an urban school, and faith based urban farms make up a partnership that has allowed for development and implementation of this project. Eligible participants and youth will be recruited through this partnership of community members in Gary. Surveys, observations, and interviews will be used to obtain baseline information from the target communities on youth entrepreneurship, as well as urban farm production. An evaluation instrument has been adapted from George and Neale (2006) STEM career and workforce mentoring and Rai, Prasad, and Murthy (2017) entrepreneurial behavior predictions. Outcomes of the project include: (1) increase youth participation in urban agriculture and stimulate interest in entrepreneurship; (2) encourage youth to pursue careers in the agricultural sector; and (3) increase fresh produce available for consumer purchase within the selected food desert community in Gary. While this innovative project is just established, the unique aspects of the working community partnership and targeting youth entrepreneurship through urban farms, merits dissemination.

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Assessing Confidence of Undergraduate Students in an EAAT Service-Learning Course

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Equine activities and therapies (EAAT) are an umbrella phrase used to describe the various methods in which horses can be used to help individuals with mental or physical disabilities. An overview EAAT course at a mid-south university allows students to gain an understanding of what makes EAAT an effective form of therapy. A service-learning component of the course offers students an opportunity to help clients with various disabilities in an equine setting. One of the objectives of this course is to increase the confidence level of students in aiding people who have disabilities in an EAAT setting. Surveys were administered and data was collected from students enrolled in two EAAT courses (N=74) at two time points; on the first and last day of the courses. Students rated themselves on five statements designed to measure confidence utilizing a Likert scale (1=strongly disagree; 4=strongly agree). Results were analyzed using Chi Square analysis in PROC FREQ. Before taking the course 25% of the students felt confident determining the type of EAAT that would benefit a specific client, while 75% felt confident after participating in the course (P<0.001). Before the course 59% felt sure in their ability to assist in an EAAT setting as a volunteer, while after the course 100% felt confident in their ability to assist as a volunteer in an EAAT setting (p<0.001). Analysis of aggregate data revealed a statistically significant increase in four of the five confidence markers.

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Second-Year Success of Agriculture Students by Freshmen Residency: A Follow-Up Study

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For the first time in Fall 2017, incoming freshmen in Agriculture at Sam Houston State University (SHSU) could reside on-campus in a residence hall with a dedicated floor for their major. All beginning freshmen at SHSU must reside on-campus unless certain, narrow criteria are met, such as living at home or being married. Researchers were interested in the effectiveness of this residency option on GPA and retention. Data were analyzed to make comparisons between the Agriculture residency cohort, other Agriculture freshmen in another on-campus residency, and Agriculture freshmen commuters in the 2017-18 academic year and the Fall 2018 semester. Amongst students with at least a 2.0 overall GPA in Fall 2018, there was a significant difference (p<0.05) in overall GPA by gender, regardless of 2017-18 residency, as females had a 0.19 higher GPA than males. Researchers also found that taking more credit hours led to a higher GPA (p<0.04), as each additional credit hour taken resulted in a 0.063 higher GPA. While no other significant differences were found, students who lived in a non-Agriculture on-campus residence in 2017-18 achieved higher GPAs (2.96) in the Fall 2018 semester than the Agriculture-specific dorm residents (2.88) and off-campus residents (2.82). Interestingly, the retention rate was found to be higher for those 2017-18 freshmen Agriculture students who resided in the Agriculture-specific dorm (81.94%) than off-

campus (78.72%) and non-Agriculture dorm (73.97%) residents; thus, those living on-campus but not in the Agriculture-specific dorm had the lowest retention rate, but the highest GPAs in the 2nd year.

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Student Response to a Faculty and Student Developed Study Abroad Manual

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Study abroad programs are offered at many universities. Finding relative supporting course content pertaining to a specific study abroad program can be difficult for faculty to locate in a single source. To address this, need a manual was created for a mid-south university study abroad program. This 250-page instructor-created manual provided students with concise background information concerning the destination, activities, culture and history of the region, as well relevant research articles. The purpose of this study was to assess student perceptions of the benefits of a customized study abroad manual. Seventeen undergraduates were given the manual one month before the start of the program and administered an IRB-approved survey pertaining to the manual at the completion of the program. This survey anonymously assessed the degree to which each student agreed with ten statements about the information, format and usefulness of the manual based on a 1-5 Likert Scale (1=strongly agree; 5=strongly disagree). Results revealed that 94% of the students found the manual easy to use, 82% liked the format and 94% felt that there was sufficient information in the manual about the culture of the country. It is also noteworthy that 76% of students reported that they would be willing to pay for a manual created for a specific study abroad program. The results of this study will be used to inform the design and implantation of future manuals created for study abroad programs.

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Nationwide Assessment of Leadership Development for Graduate Students in Agricultural Plant Sciences

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Leadership development is universally important across the agricultural plant science disciplines, as individuals with strong leadership skills can successfully complete tasks and make sure projects run smoothly in any employment setting. Although studies have identified a need for leadership skills, less is known about effective training in graduate programs. Leadership abilities can be developed through training implemented in several ways: formal coursework, workshops, seminars, mentoring, and informal learning, such as online articles, books, and observing others. To assess leadership development for graduate students, we constructed a mixed-method study designed to assess current graduate students, and early-, mid-, and late-career scientists about their most significant leadership experiences. We sub-sampled the U.S. population of agricultural plant scientists, systematically selected from three American societies memberships, and deployed the survey using Qualtrics software. The survey population consisted of 6,000 people and, in the first 48 hours, the research questionnaire received more than 460 responses and remained available for three weeks. Preliminary results showed most participants reported employment in a doctoral institution (46.60%), followed by government (17.45%) and industry (16.17%). Most participants reported their most significant leadership experience occurred somewhere other than graduate school. Important skills for success in their leadership roles were reported as: effective listening, efficient and effective work habits, ability to identify and analyze problems, being accountable, and respect and acknowledge contribution from others. Results will be analyzed further to identify gaps and opportunities in current graduate leadership training within the agricultural plant sciences, and ultimately increase graduate placement and success rates.

Assessing the Effectiveness of Three Forms of Promotion for a Faculty-Led Study Abroad Program

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Many faculty members lead students on study tours abroad. Faculty typically promote study abroad programs by hosting informational sessions, presenting PowerPoints to classes or student groups, creating posters and speaking with interested students one-on-one. Recruitment and promotion for a study abroad program is a time-consuming task and can be difficult to juggle with required faculty obligations. One objective of this IRB-approved study was to examine three formats to determine the best way to promote and recruit a study abroad program to university students. Students in three classes (N=90) were given the opportunity to participate in the study. They were exposed to a four-minute student produced video which included student perceptions of the study abroad program by students who had participated in a previous program, a four-minute PowerPoint presentation by the study abroad leader and an informational poster. After seeing the three forms of promotion, students were asked to complete a survey and anonymously rate their interest in the program based on format of promotion. Results revealed that 10% of students surveyed preferred to receive information about a study abroad program by reading a poster, 47% preferred to receive information from a PowerPoint presented by faculty and 43% preferred to receive their information from a video. Further analysis revealed that 59% of freshman (n=34) preferred to receive information about a study abroad program in a video format. Additional studies are needed to determine the most effective format to promote a study abroad program based on student demographics.

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A Two-Year Comparison of Success of Beginning Freshmen in Agriculture by Residency

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Incoming freshmen at Sam Houston State University (SHSU) must reside on-campus unless they are a commuter student within 60 miles of campus, obtain a medical release, have a financial hardship, are married, or meet another defined criterion. Agricultural faculty members at SHSU worked with Residence Life staff to establish an option for incoming freshmen students in Agriculture to be housed on the same floor of the same residence hall. Researchers sought to determine whether the students in the "residence cohort" were more successful compared to beginning freshmen in Agriculture in another random residence hall or commuters. Fall 2018 was the 2nd semester of this initiative. Interestingly, the Fall 2018 group achieved lower mean overall GPAs than their Fall 2017 counterparts in each residence category, but none were statistically significant; thus, choice of residence does not appear to have an effect on the success of beginning freshmen in Agriculture. The mean overall GPA for the entire Fall 2018 group (2.90) was lower than that of the Fall 2017 group (2.94), even though Fall 2018 females (2.99 GPA) did outperform Fall 2017 females (2.95). The mean difference was much greater between males in Fall 2018 (2.75) and Fall 2017 (2.91) even though statistically there was not a significant difference. By ethnicity, African American freshmen in Fall 2018 did achieve a noticeably higher GPA (2.68) than the Fall 2017 African Americans (2.47), and Hispanic students in Fall 2018 also outperformed Fall 2017 Hispanics (2.95 vs. 2.89).

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Effects of Study Abroad on Intercultural Competence

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Intercultural competence is known as a set of skills including communications, intercultural social skills, and open-minded perspectives to others' cultures. The purpose of this study was to assess specific intercultural

knowledge, skills, and abilities as perceived by students in a study abroad program. Texas A&M University students (N=88) participated in short-term agricultural study abroad programs to Costa Rica (2017-2019); they were asked to record their intercultural knowledge, skills, and abilities in pre- and post-travel settings. Qualitative design and content analysis were used to examine the data. Common themes from pre-departure surveys showed students expressed a lack of intercultural knowledge, but an eagerness to learn about it. Post-travel surveys indicated growth in intercultural competence, such as gaining an appreciation for other cultures. Students expressed open-mindedness toward other cultures, which is important in communicating in diverse settings. One post-travel response stated, “[I] gained a new appreciation and understanding for other cultures.” Others mentioned competence gained as “understand what [another] culture is like, be able to operate in it, and portray [their own] culture respectively.” When comparing pre and post-travel responses, positive growth appeared in intercultural understanding, open-mindedness, and communicating effectively in different cultures. The agricultural industry is worldwide; professionals need to communicate and understand other cultures to compete worldwide. For this reason, intercultural competence gained through study abroad is useful in the agriculture industry. Study abroad combines hands-on experience, while being immersed in a different culture; an ideal setting for gaining intercultural competence and professional skills.

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Learning Outcomes from a Graduate Learning Community in a College of Agriculture

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A graduate learning community composed of traditionally underrepresented minority graduate students in a college of agriculture was designed to assist graduate students in integrating both academically and socially into graduate school. This two-year learning community was targeted at diverse populations with a focus on retention, success, timely progress towards degree and developing leadership and mentor/mentee skills. In this presentation, the results of a study to examine the reactions to learning, increases in knowledge, skills, or experience, and changes in behavior of graduate students involved in a graduate learning community will be shared. Results were obtained through surveys sent after each learning community session. Two years of data will be shared. A total of 15 graduate students were enrolled in the program within the two-year period. Graduate students gained knowledge in identifying strengths, writing grants, team building, implicit bias, and navigating the graduate process. Graduate students report behavior changes of being able to recognize their own implicit biases, improved scheduling, being better able to address conflict/challenges with their graduate advisor and being more confident in their ability to succeed in graduate school. This study documents how the graduate learning community has provided graduate students with opportunities to successfully integrate academically and socially into graduate school.

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Undergraduate Internship Melds Soft Skills, STEM and Service to Peers

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Employers currently seek job applicants with demonstrated soft skills that augment their hard-technical disciplinary skills. Recruiters note that top-notch soft skills outweigh experience when it comes to promotion to leadership positions. These skills are also valuable in areas such as volunteer service. Agriculture undergraduates need solidly demonstrated soft skills to compete successfully for jobs, promotions, and other post-baccalaureate endeavors. This study assessed the status of soft, science and peer service skills of undergraduates during internships. From fall 2017 through fall 2018, 12 interns at the University of Maryland Eastern Shore engaged in research or experiential activities related to food safety, soil health, sustainable agriculture, animal science and veterinary medicine, and provided peer mentoring and tutoring

services to freshman. At the end of each semester, both the interns (n=12) and faculty mentors (n= 5) rated interns' 16 soft skills from good to excellent on a scale of 1-4 (1, poor- to -4, excellent). In a separate assessment of 11 interns, at least 60% were proficient in six of seven skills criteria used to measure communication and critical thinking on the research projects they conducted, including oral communication. On the writing criterion, 55% interns were rated as marginal and 36% were proficient. Overall, interns rated their peer tutoring and mentoring service skills as adequate to much value on a scale of 1-5 (1 = none; 2 = inadequate; 3 = adequate; 4 = much; 5 = excessive). This project will be continued with adjustment for more emphasis on interns' written communications.

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Smaller, More Frequent Assessments May Reduce Students' Ability to Recall Information

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Frequent, low-stakes, formative assessments can provide valuable feedback to both students and instructors. Formative assessments have also been shown to enhance student learning. However, many STEM instructors, including those in professional schools, rely solely on high-stakes, summative assessments such as unit, mid-term, or final exams. Our goal was to determine how administration of weekly quizzes impacts student learning (n=27) in a graduate/professional-level veterinary physiology course. For two units (endocrine and cardiovascular), weekly quizzes were administered in addition to a summative, unit exam. Quizzes consisted of lower-order questions (e.g. recall) while exams consisted of higher-order questions (e.g. integrate, apply). For two additional units (neuromuscular and reproductive), only unit exams were given which consisted of both lower and higher-order questions. Academic performance was evaluated via high discrimination (point biserial>0.3) and easy-moderate difficulty (50-99% correctly answered) questions. Knowledge retention was evaluated using these same questions on post-tests, administered a minimum of seven weeks after unit exams. Initial analysis for three of the four units did not reveal differences in performance for either lower or higher-order questions when quizzes were given compared to when they were not. Knowledge retention associated with higher-order questions was also not impacted. However, knowledge retention associated with lower-order questions was significantly reduced ($P<0.02$) when weekly quizzes were administered (26% reduction in score) compared to when they were not (16% reduction in score). Therefore, smaller, more frequent assessments may hinder rather than enhance students' ability to recall information several weeks after originally being assessed.

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Kolb's Learning Cycle in Costa Rica

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Students traveling abroad explore new cultures, highlight different experiences, and enhance their education. According to Kolb's Experiential Learning Cycle, learning is the process whereby knowledge is created through the transformation of experience. Studying abroad can be affected by a student's transformation of experience; it can also affect how students react to different cultures and learning environments. Therefore, the purpose of this research was to describe students' learning styles for those who embark on international experiences pertaining to agriculture. Texas A&M University students self-assessed their learning styles into one of four categories according to Kolb's Experiential Learning Cycle. Those who traveled to Costa Rica for a two-week study abroad in 2018 and 2019 were most likely "Doing" type learners. Our data showed that of the 62 students who participated in the last two years, 37 were categorized as Doing learners, 25 were Feeling type learners, while Thinking and Watching were nearly equal in the number. No significant differences in learning styles were found when analyzed by year of program or gender. After analyzing the data, we concluded that Active Experimentation was the most preferred learning style. In conclusion, study abroad programs would benefit from targeting Active Experimenters and finding ways to market such programs as active, hands-on, experiences for all students.

Community Engagement Projects: A Comparative Analysis of Student and Alumni Impacts

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This study evaluates the role of Extension-based community engagement projects in developing core technical competencies, critical thinking, and professional values. Many design programs employ community engagement, service-learning, and engaged scholarship to address local community-based design dilemmas. Those situated within agriculture schools often frame these activities as contributory to their institutions' land-grant missions. However, little research has been published on how Extension facilitates programs' engagement of community-based design issues and their benefits. Within a broader assessment of Utah State University's Extension landscape architecture program's community engagement work spanning four decades, the program's alumni and current students were surveyed to determine impacts of its Extension-based community engagement activities, their perceived value, and support for Extension-based collaborations. A comparative analysis of survey data revealed community engagement projects' importance in development of core professional competencies including software skills, design, and critical thinking abilities; and professional values such as collaboration, communication, empathy, and leadership. Alumni and current students both reported positive impacts on development of their core professional competencies. Both groups also reported including work samples from these projects in their early professional portfolios, their contributory role in connecting students with alumni, and that they leveraged these projects for an internship or permanent employment position. Regarding professional values, students and alumni overwhelmingly reported the projects were instrumental in developing skills in communication, collaboration, leadership, and empathy. As land-grant design programs assess the value of their work, Extension-based community engagement projects present an array of benefits for instilling core competencies—and development of professional values.

Cultivating a Culture of Awareness: Using the Intercultural Development Inventory (IDI)

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Colleges of agriculture are responsible for preparing professionals to be culturally competent as they enter a diverse and globally competitive agricultural workforce. Intercultural competence, the ability to bridge diversity and inclusion based on understanding and adapting behaviors based on recognizing commonalities and differences, is attributed to individuals having effective professional outcomes. Honors students in colleges of agriculture potentially have more access to experiences to develop cultural competency including honors coursework, international programs, journaling and reflective practices, arts performances and literature, and collaborative undergraduate research. The IDI is a quantitative instrument that reports an individual's position on the IDI continuum which includes denial, polarization, minimization, acceptance and adaptation. The purpose of this study was to determine honors students perceived cultural competency using the IDI assessment in the college of agricultural, food and life sciences (AFLS) honors orientation class. The IDI was administered to students enrolled in the course including freshmen, peer mentors, and a graduate teaching assistant (n= 61) to establish baselines for perceived (PO) and actual (DO) cultural competence. A response rate of 82.5% (n=52) was obtained. Results demonstrated most students (n=37) has a PO of minimization with movement towards acceptance. However, most students (n=32) reported a DO of polarization with forward movement towards minimization. These findings represent the potential for growth along the IDI continuum. Recommendations include building purposeful cultural opportunities and experiences into course curriculum as well as administering the IDI in three years to measure students' movement on the IDI continuum.

The Time Veterinary Medicine Students Study Each Week is Driven by Exams, not Quizzes

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Research has shown that distributed practice is a more effective study strategy than massed practice but when students are assessed infrequently, they are likely to resort to “cramming.” However, if instructors implement frequent assessments to encourage distributed practice, they may be increasing overall workload or impacting the time available for other courses. Our goal was to determine how weekly quizzes impact study habits for veterinary medicine students (n=27) in our graduate-level physiology course. These professional students take 19-21 credit hours/semester of core courses as a cohort. For 1 physiologic unit (1 unit = 1 body system), weekly quizzes were administered in addition to a summative, unit exam. For 2 other units, only unit exams were given. Study habits were tracked with weekly surveys. For physiology, students studied an average of 2.3 hours/week when no assessments were taken, 5.0 hours/week when a quiz was taken, and 11.7 hours/week (range = 11.2-12.0) when an exam was taken. Overall, students studied an average of 21 hours/week with a range between 11 (0 exams, 2 quizzes) and 30 (3 exams, 2 quizzes) hours/week. The number of study hours per week was highly correlated with the number of total assessments ($r=0.79$) and the number of exams ($r=0.88$). No correlation was identified between number of quizzes and study time ($r=0.01$). These results indicate that students alter their study habits based on assessment load, but this effect is driven by exams which have a more significant contribution to final course grade.

Peer Mentoring Using Habitudes in Ag Honors Course and Learning Community

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Purdue Agriculture offers a one-credit-hour honors course entitled “Dean’s Scholars Peer Mentor Experience” for upper-class agriculture students in the Dean’s Scholars program who are selected as peer mentors to assist with the first-year students enrolled in the “Dean’s Scholars Seminar” course and learning community. The course objective is to train and educate peer mentors to lead small group discussions, facilitate in-class assignments and activities, encourage involvement in learning community events, and become servant leaders. Peer mentors learn the art of connecting with others and navigating transitions by utilizing Habitudes: Images That Form Leadership Habits & Attitudes, a series of books written by Dr. Tim Elmore of Growing Leaders, to help college students through real-life challenges and opportunities they face on campus and to prepare them for life beyond the classroom. The Habitudes system is a leadership development curriculum that empowers the peer mentors to become role models, open-minded and compassionate leaders, and provide a unique method to teach life and leadership. By utilizing images to represent timeless, universal principles, Habitudes provides leadership messages, discussion questions, storytelling opportunities, case studies, personal assessments and assignments. These unique and transformative encounters with peer mentors build leadership habits and enhance their ability to mentor peers. Additional course outcomes include character development, identification of personal values, discovery of strengths, taking initiative, and developing critical thinking skills. Habitudes provides creative and engaging ways for students to learn and practice leadership.

Communication Gap: Discrepancies Between Student Perceptions and Employer Expectations

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Employers have consistently ranked writing and communication skills as top competencies sought in potential employees. However, employers have expressed frustration regarding college graduates' skills in these areas. If students do not value or perceive writing and communication skills the same as potential employers, they may not be motivated to learn about those skills. This discrepancy in perceptions might explain, in part, why employers do not believe graduates are skilled in communication. The purpose of this study was to understand students' perceptions of writing. A survey was completed by 443 students at the University of Illinois Urbana-Champaign. Students were asked to define "good communication" in an open-response question, which was coded based on the direction of the communication: one-way, two-way, or not specified. Additionally, students were asked what areas of writing were important to learn for their careers. 57.5% of students indicated communication was a one-way process; 36.0% defined communication as a two-way process. The majority of students also expressed a belief that future career success would require an improvement in their writing skills in the areas of application materials (74.0%) and for research purposes (70.7%). But fewer thought they needed to learn proper writing skills for emails (37.2%) and social media (13.8%). Educators should focus on teaching students that communication goes beyond simply sharing information with people and is also a two-way process. Additionally, classes should emphasize proper writing skills for online settings, including emails and social media, to help underscore the importance of these skills in the workplace.

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Oral

Exploring Undergraduate Transfer Student Pathways and Success in Microbiology

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Transfer students from two-year colleges are more likely to be women, underrepresented minorities, and low income than their non-transfer peers. These and other challenges translate to lower retention rates in STEM. To enhance success of two-year to four-year students, the Microbiology and Cell Science (MCS) program has implemented and is evaluating the impact of multiple interventions including a hybrid online 2+2 track and bootcamp labs. A mixed methods approach is used that includes descriptive analytics, regression analysis to identify factors affecting student outcomes, and qualitative analyses in the form of student interviews and surveys. Characteristics and outcomes of non-transfer students (N=900), on-campus transfer (N=240) and hybrid online transfers (N=182) were compared. Transfer students have lower six-year degree completion rates (55%) than their non-transfer peers (87%). Notably, the online transfer cohort has more URM students compared to the on-campus cohorts (45% vs. 25%), which is important because the transfer gap is wider for URM students. Most transfer students have financial need; however, only 30% are eligible to receive need-based scholarships that require full-time enrollment. Results reveal that online transfer students enroll part-time four times more often than on-campus transfers. Enrolling part-time decreases time to graduation and decreases retention. Qualitative research is revealing motivations for enrolling full vs. part-time. While interventions such as a hybrid online program has been successful in increasing diversity in STEM, transfers still face a unique set of challenges. Understanding their pathways should reduce time-to-degree, increase retention, and serve as a model for other STEM disciplines.

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Oral

Challenging Perceptions of the Natural & Built Environment in First-Year College Students

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Utah State University offers a popular design oriented general education course focused on introducing students to the nature, history, and methods of landscape architecture. This course questions student's perspective and opinions about the built and natural environments. Innovative activities designed to motivate students to consider their impact on the natural world and observe their surroundings are incorporated into the class. These activities use the design process to ultimately change their behavior by providing tools and basic skills to improve their world. An example is an assignment where students observe and critically evaluate successful and unsuccessful built and natural spaces on campus, indicating their

opinion of the attributes that make those spaces successful or unsuccessful. Students then are required to recommend design solutions to modify and improve a space they have deemed unsuccessful. Beginning and post-semester surveys are conducted to assess awareness and perceptions of the natural and built environment. Information is also gathered to gauge whether exposure to the design-focused curriculum has resulted in behavioral changes in environmental interactions. Notable changes in students' awareness, perception, and interaction with the natural and built environment will be presented. For example, over 85% of students indicate because of the course, they are making some or significant adjustment to their interaction with the environment, with 15-20% making significant adjustments. Reflective responses indicate heightened awareness of human impact on the environment, as well as a significant increase in observational behavior following taking the course.

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Oral

Improving Communication between STEM Scientists and Consumers

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Scientists working in STEM related disciplines are expected to communicate with others in the science community without specific training on how to communicate scientific research results and concepts to non-science audiences. Because of miscommunication, consumers often harbor mistrust and skepticism. The purpose of this study, therefore, was to investigate the science communication practices and interests of STEM scientists and the skills and resources they need to communicate science effectively with the goal of creating a toolkit that will provide scientists with trainings and resources tailored to their specific needs. We developed a survey based on the six constructs in the Science Communication Learning Goals model and distributed it to scientists in the colleges of agriculture, engineering, science and veterinary medicine and biological sciences at a large research institution. Results from 230 respondents indicated that the large majority (n=168) were interested in science communication, yet 163 responded they had not received training related to science communication within the last three years. Of 230, 152 noted communication experience as very important or extremely important and 85 noted specific training and help from professional science communicators as very important or extremely important to communicating science effectively. Respondents expressed a high level of interest in receiving resources and participating in training programs to improve their science communication skills. Therefore, creating a toolkit to assist scientists in developing their ability to communicate with non-scientific audiences is a step toward improving relations between the scientific community and consumers.

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Oral

A View of the Top, From the Side

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Great teachers have the extraordinary ability to inspire and motivate even those that resist learning. The top educators are not only knowledgeable about the content of the course they are teaching but often conscious of the information, literature and practice of instructional delivery to their audience. Many exemplary educators have been profiled and studied, followed by attempting to emulate from ambitious

peers. However, there is a gap between the examples of disciplines published and what the teachers of animal science do. The objective of this project was to identify and describe what the characteristics are of the best animal science teachers. The inclusion criterion for selecting faculty was being bestowed an excellence in teaching award through their professional organization. Each teacher answered a series of questions about themselves, their students and the class being taught both before and after the lecture. Lecture was captured using a digital all-inclusive camera and later analyzed for pedagogical trends and instructor-student interactions. Despite a variety of topics being taught, there were multiple trends emerging from these classrooms. Common events included, reviewing previous lectures, distributing something physical to the students, posing questions during class and calling on students by name. Each teacher taught differently, but they all understood their audience; they grasped the subject matter and most importantly, they valued students learning. Collectively, these findings can be taken by other teachers and be applied and utilized in their own environment in an attempt to foster improved student learning through excellent teaching.

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Oral

Hitting Pause: Practical Ways to Incorporate Reflective Learning Experiences in Class

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The objectives of this oral presentation are to (1) to demonstrate practical ways to effectively incorporate “pauses” (reflective learning experiences) into teaching and (2) to highlight the powerful benefits of faculty-based Learning Circles. A Learning Circle is a community of faculty who meet on a regular basis to share ideas for active teaching strategies and discuss research and literature focused on effective pedagogy. The presenters have been participating in a Learning Circle at Utah State University since September 2018. As part of a larger group, they spent several months reading and discussing the book, *Hitting Pause*, by Dr. Gail Taylor Rice and worked together to understand and effectively implement “pauses” in a variety of course types, sizes, and formats. Pauses – or lecture breaks – are an example of an innovative teaching approach that facilitates student-centered learning, deep processing and meaningful reflection, student engagement, and student empowerment. The presenters will discuss some of their favorite “pauses” and talk about their biggest challenges for application.

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Oral

Talent Themes and Academic Success among Agriculture and Natural Resources Students

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Talent identification and development among students has become a popular initiative on college and university campuses toward goals of increased student retention and degree completion rates. To investigate possible predictive relationships between students’ innate talents and traditional college academic success measures, researchers explored talent identification results and academic records for 551 bachelor’s graduates from agriculture and natural resource disciplines who had completed the Clifton StrengthsFinder® assessment during a first-year seminar course and who also fulfilled requirements for their degrees within a six-year timeframe. Subjects were classified using their top five Clifton StrengthsFinder® identified talent themes into one of five talent theme-based groups (Dominant Relating, Dominant Impacting, Dominant Striving, Dominant Thinking, or Divergent). Discriminant analysis procedures were employed to determine predictive relationships between the theme-based groups as criterion variables and the quantitative predictor variables, which included cumulative GPA at degree completion, number of semesters in academic distress, number of academic major changes, and time to degree completion. The correlations between the academic success measures and the discriminant functions revealed that the academic success predictor variables loaded differently onto all four functions.

The four variates did not significantly discriminate the group in combination [$\lambda=0.97$, $\chi^2(16) = 18.55$, $p=0.29$], meaning college student success measures showed no predictive value in distributing the subjects by talent theme groups. Comparable levels of successful academic functioning among graduates across all five talent theme groups suggests that regardless of students' specific talents, academic success may be achieved within agriculture and natural resources disciplines.

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Oral

Integration of Social Science Dimensions into an International Animal Agriculture Course

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To expand the global perspective of Iowa State University students, an international animal agriculture course was developed in 2013 that compared and contrasted livestock production systems in the U.S. and developing nations. Two important course topics were the role of animal-source foods in meeting human dietary nutrient requirements and the importance of livestock production systems in attainment of global food security. The objective of this paper is to describe the impact of integrating economic and social development indicators into this technically oriented agriculture course. Economic and social development indicators introduced to students several objective measures by which to compare developing countries. Indicators explained during lecture included gross domestic product and gross national income (in absolute and per-capita terms), GINI coefficient (an income distribution measure), and human development index (assesses life expectancy, education, and income). Students were subsequently required to include these indicators in oral presentations. Integration of social science dimensions (i.e., financial resources, human capital as agricultural labor, religious considerations) into the natural science aspects (e.g., land and water resources, livestock breeds, feedstuffs) of the course enabled students to better understand what shaped the global structure of animal agriculture. Feedback from students suggested that their initial struggles to understand the relevance of social sciences to livestock production were overcome when they applied the concepts during development of their country project. Based on these observations, we encourage agricultural science educators to introduce social science aspects into their courses to facilitate student cognition of the intertwinement of natural and social sciences in agriculture.

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Poster

School Based Agricultural Education Supporter Personas: A Study of Shared Viewpoints

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Schools need support and action from businesses, universities, and community organizations to ensure students' success in the 21st century workplace. Educational partnerships can improve school functioning, prepare students for a career, and increase U.S. economic competitiveness. Collaboration between employers, teachers, and students will create a more effective education system. Understanding the unique characteristics, attributes and preferences of individuals within educational partnerships is a vital part of recruitment and retention. The purpose of this study was to examine the perspectives that exist related to school-based agricultural education supporter personas to then inform recruitment and retention strategies in education. We defined supporters as community, business and industry, and government-affiliated individuals that support high school agricultural programs through their time, talent, or resources. We used a Q methodology to find similarities and differences in the viewpoints of (n=49) participants to identify segments of shared opinions. Participants were presented with a set of statements pertaining to educational partnerships in general education, agricultural education, and agricultural extension, and asked to rank them on a quasi-normal curve based on their personal preferences. During data analysis, we conducted correlation and factor analysis procedures to find the number of similar participant groupings. Based on our findings, the participants placed the most meaning in statements pertaining to the future success of students, their knowledge of agriculture, and career opportunities in agriculture. The results lead us to recommend that communication aimed at recruiting and retaining supporters should focus on the positive influence that agricultural education has on students' lives.

#AgEd2Malaysia: Reflective Perspectives of both Host and Guest

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Global competence is a skill set that has become a necessity for a variety of reasons in most every discipline in the agricultural sciences. With an increasingly diverse student population in our school systems coupled with an increasingly complex global agri-system, now more than ever we need globally competent educators and learners in order to develop a globally competent workforce and society. A common intervention in cultivating global competency is the study abroad immersive experience; however, have we ever thought about the learning that is being constructed and perceived by both the travelers and the hosts? A USDE funded Fulbright-Hayes experience provided the opportunity for school-based agricultural educators (both candidates and practicing educators) to engage in a four-week experience with their Malaysian counterparts exploring the interconnected nature of culture, agriculture and education. Throughout the experience 20 participants (six US pre-service, six US in-service school-based agricultural education teachers US, and eight pre-service Malaysian life skills education teachers) engaged in daily structured reflection sessions using the pre-defined TIPS method. TIPS is an acronym for Thing, Idea, Person, and Self. Journal entries were coded and analyzed for both Malaysia and United States participants. Participants from both countries respectively found growth in pedagogy, curriculum content, cultural awareness, self-awareness, as they became more globally competent educators and learners. The reflective journaling processes utilized and best practices for application to multiple contexts and content will be discussed as well as navigating international collaborations between community colleges, large land-grant universities and international universities.

High School Teacher Adoption of New Statewide Curriculum: A Pilot Study

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Many factors influence a teacher's decision to adopt new curriculum. By understanding how agriculture teachers choose to implement a new curriculum available to them through the lens of the Theory of Implementation, this study aimed to better understand how and why teachers adopt a new curriculum and what barriers prevented them from adopting a new curriculum. Two teachers, who have implemented a sustainable agriculture curriculum into their Agriculture Education Program at their schools, were interviewed. The purpose of the study was to explore and derive meaning from the experiences of the instructors adopting the new statewide curriculum in high schools across North Carolina through a basic qualitative approach. Interviews were audio recorded and transcribed through a transcription service but were reviewed and edited for accuracy of the participant's statements. Validation of the qualitative data was applied through trustworthiness, dependability, credibility, and confirmability. Transcriptions were coded, categorized, and placed into themes to produce the findings. The sole instrument of data collection was the researcher who was cognizant of their reflexivity. The two teachers interviewed had adopted the curriculum and were in year two of implementation of the curriculum. Findings emphasized that support from outside agencies was critical during the implementation process and the need for physical resources was also critical to properly implement the curriculum. This information can be used in North Carolina to further the adoption of the curriculum but can also be used nationwide to understand the barriers to teacher adoption of new statewide curriculum.

Rural Nonprofit Organizations in Haiti: Gender and Technology Transfer

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This work is part of an experiment in Haiti that assessed three models of technology transfer: farmer field school, the land grant approach, and master farmer. The goal was to identify which of the models is most effective in generating technology adoption. Farmers' organizations are platforms that connect farmers to larger institutions globally and are prevalent throughout rural Haiti. This experiment also explored the interactions between the three treatments and the farmer organizations because efficacy of the organization was hypothesized as a factor in technology transfer. Thirty farmers' group located in a municipality near the capital of Haiti, Port-au-Prince participated in the research. Haitian women have a historical role in agriculture both in marketing and in production. Therefore, understanding gender dynamics in the farmer organizations was one component of the relationship between farmer groups and experimental treatment. We used mixed methods of data collection, combining the development of an index and a semi-structured interview in order to identify gender-related factors that could influence technology adoption by farmers. Twenty-four mixed-gender associations and six women-only associations participated in this component of the study. For this presentation, we will report the difference between women-only associations and mixed-gender associations concerning the rate of adoption of technology transfer. We will also discuss potential difference in adoption rates for men and women and describe the reasons that impede the use of technology for men and women. The University of Florida implemented this experiment through a funded by the United States Agency for International Development (USAID).

Reverse Crossword Puzzle Assignments Increase Student Confidence but Not Knowledge of Greenhouse Terminology

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Crossword puzzles are an assignment well-suited to aid student learning of discipline-specific terminology. During fall 2017 (n=40) and 2018 (n=34), students in the Greenhouse Operations Management course at Kansas State University completed reverse crossword puzzle assignments about greenhouse structural terminology whereby they generated definitions for terms and found an image that represented the term. Pre- and post-surveys were administered before and after the instruction of this content, paired with the assignment, to evaluate changes in student confidence about their knowledge of the terminology. Exam scores were used to evaluate actual knowledge gain. Data was pooled across years. Students disagreed that they had completed a reverse crossword puzzle before this assignment (2.6+1.75 with 1=Strongly Disagree) but agreed that they find crossword puzzles to be fun (4.1+1.14 with 6 = Strongly Agree); 12% more students agreed that 'crossword puzzles are fun' after completing the assignment. There was a highly significant increase in student confidence about their knowledge of greenhouse terminology between pre- and post-surveys. For example, students only somewhat agreed that they knew the difference between a greenhouse, high tunnel and cold frame before the intervention (3.5+1.64), but responses increased to agreement in the post-survey (5.2+0.95). Despite these gains in student confidence, there was no correlation between assignment score and either 1) responses to exam questions that covered this content or 2) overall exam score.

The Relationship Between the Time of In-Class Evaluation and Students' Learning

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Class performance assessment is essential for measuring and improving students' active learning during lectures. The objective of this study was to assess the relationship between the time of class evaluation and students' learning during the class period throughout three semesters in a junior level basic animal nutrition class at Oklahoma State University. Data were collected during the Fall 2016 (228 students), Fall 2017 (228 students) and Fall 2018 (226 students) from students enrolled in Principles of Animal Nutrition (ANSI 3543). One in-class question was designed to evaluate the students' performance for each class period. The questions were assigned to students at different times ranging from 16-48 min from the outset of the class in different days. The actual time of assigning the question from the beginning of the class and the percent of correct answers to that question were recorded using Top Hat® during every class throughout the semesters. A linear regression analysis was applied to determine the association between the time for assigned questions and the students' score (60-100%). The analysis output revealed a tendency for negative correlation between the time of class assessment and the score of students (P value = 0.06 for Pearson Correlation and P value = 0.1 for ANOVA). This is indicative of better students' performance when the assessment was performed earlier during the lecture period. In summary, our data suggest that assessing the students learning in shorter intervals during the class periods may help to improve the active learning of the students.

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Oral

Evaluating Student Engagement in a Combined Learning Community Study Abroad Program

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High impact practices (HIP) provide active learning opportunities promoting student engagement and development. The objective of this study was to assess combining two HIP on student engagement indicators. A Learning Community study abroad program was developed to study animal production in Italy during July, followed by on-campus experience in the fall semester. Nineteen incoming first and second-year students participated in the course. The course was designed to facilitate faculty and student interaction, learning outside of the traditional classroom, and collaborative inquiry and discovery. Course activities included intercultural reflective assignments, an outreach project, and social events. During the last week of the semester, selected questions from the National Survey of Student Engagement instrument were administered to measure student engagement related to academic challenge, learning with peers, experiences with faculty, and campus environment (100% response rate). Most students responded that the course experience contributed to their ability to work with others (79.0%) and to the development or clarification of personal codes of values and ethics (79.0%). One objective of the course was to promote self and cultural awareness. Students indicated the course increased their ability to be an informed and active citizen (63.2%) and helped them better understand people with diverse backgrounds (79.0%). A percentage of students reported that during the school year they tried to better understand someone else's views by imagining how an issue looks from their perspective (73.7%). Overall, students in this program reported increased levels of engagement, illustrating the potential for combining two HIP into one experience.

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Poster

Impact of Study Abroad on Professionalism

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Professionalism is one of the most valued qualities an individual can develop. Professionalism attributes most noticed by employers are time management/attendance, work ethic, active listening, and appearance. Professionalism also includes self-awareness, appropriate behavior, emotional maturity, and preparation. Self-awareness portrays the awareness of your body as well as the people around you. Therefore, the purpose of this study is to investigate professionalism skills gained from a short-term study abroad program and how it has changed a students' perspective. Emotional maturity conveys how well the response is to

the situation, controlling emotions and being sophisticated enough to deal with others. Texas A&M University students participated in agriculture-oriented study abroad programs (2017-2019) where they had opportunities to engage with groups (small commercial farmers) of different cultural backgrounds. Almost 90 students participated in pre- and post-study abroad surveys asking for their perceptions about professionalism and unprofessional skills. Before travel, students valued leadership and time management as professionalism skills, and after travel leadership was strongly valued as a very important skill of professionalism. Characteristics or beliefs about unprofessionalism included one's hygiene, as well as tardiness. Our data show the impact of study abroad on professionalism. Study abroad affects how students perceive themselves in many settings, not just professional ones. Their realization of professional and unprofessional skills helps them interact with others, work in groups, and may help during in interviews and job settings.

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Oral

Focused, Structured, Accessible: Effective Professional Development in Global Learning using Essential Questions and Technology (#GLAG19)

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How can you provide opportunity for the sharing of best practices and knowledge in the specialized area of knowledge of global learning in food, fiber, and natural resources with participants representing 41 states and 9 nations on 6 continents, yet still meet the interpersonal connection needs of participants? This was the challenge facing the Global Teach Ag! Initiative as they designed a week-long global learning in agriculture professional development experience for 318 participants. Participants included the populations of secondary school-based agricultural educators, extension educators, post-secondary faculty and other interested parties. Each day was focused on a specific essential question with solicited on-demand presentations on that topic released each morning. A total of 16 presentations were shared via the technology platform VoiceThread across 5 days totaling 5 hours 15 minutes of created instructional content. At the end of the week, there were 248 unique views and 481 comments left. Comments can be left by audio, video or text. Additionally, a daily evening Zoom meeting was facilitated by a unique Global Learning Partner to further explore the daily essential question. The five zoom meetings had a total of 137 participants. Conference participant (N=318) evaluation was conducted and structured follow-up interviews with on-demand presenters and roundtable hosts were occurred to attempt to capture perspectives from all sides of the teaching/learning relationship. Pragmatic practice for collaborative implementation of this distinct technology platforms for wide-ranging synchronous (live) and asynchronous (on-demand) professional development will be shared with conversation around translation to other contexts and content.

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Poster

Identifying Teachers' Needs in Forestry and Forest Ecosystems

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Industrial, technological, and societal changes require teachers to be continually engaged in professional learning activities that promote new scientific approaches to education and content. Providing teachers with current and relevant professional development is an important task in secondary education. This study sought to identify the professional development needs for educators who teach forestry and forest ecosystem content to secondary students. Researchers used the Delphi method with two participant groups to investigate the diversity of thought held throughout the southeastern United States. Participants were agriculture and environmental science teachers, state department of education administrators, foresters, and environmental scientists. Participants identified eleven areas of educational need: 1. Forestry career days, 2. Tree diseases and pathogens, 3. Graduation requirements limit student opportunities to take

electives, 4. Career counseling in forestry jobs, 5. Educate students about degrees needed for forestry careers, 6. Over commitment of students to extra-curricular activities, 7. Lack of foundational forestry knowledge, 8. Lack of forestry /agriculture programs in schools, 9. Develop forestry electives in middle school, 10. Lack of foundational forest management knowledge, and 11. Connect classroom content to FFA and Envirothon extra-curricular activities.

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Poster

Agriculture Practicum

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Due to the complexity of secondary agriculture education programs, it became apparent during the development of the teacher education program at Abraham Baldwin Agricultural College that additional content should be provided to include the “other” topics not covered in curriculum, pedagogy, and early field experience courses. The need for additional content quickly evolved into an Agriculture Practicum class and a highlight of the degree program. The class was developed based upon the experiences of in-field agriculture education teachers. Initial development involved the review of possible content by program faculty. The list of desired content proved to be too much to cover in a 15-week course. Following the initial brainstorming phase, the list was revised and divided into individual constructs. The following constructs emerged: facilities and equipment, recordkeeping, CDE preparation, managing livestock programs, educational technology, professional associations, working with administration, edTPA preparation, experiential FFA opportunities, and school visits. In addition, students were required to “Pick 10.” The “Pick 10” assignment allowed students to experience the extra events that define agricultural education. Students were provided a list of 20-plus experiential opportunities from which to select ten most relevant to their educational needs. Following their participation, students reflected upon their experiences. This course has proven highly successful and popular. Students appreciated the experiential opportunities and relevancy to their future careers. In a simple post-course survey, the students rated ‘working with administration’ and ‘school visits’ as the topics most useful to their future careers. Topics on ‘facilities and equipment’ were rated as least useful.

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Oral

Did they do the reading? #GLAGReads Explores Books Versus eBooks

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Robin McLean
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Joe Cho
Fellow Research Associate

Did they do the reading? Implementing readings in educational environments can be challenging. A recent professional development program for global learning in agriculture (#GLAG19: Cultivating empathy in a Global World) utilized the Roger Thurow book, “The First 1000 days”. Participants (N=318) were provided access to the book with 100 being provided a hard copy of the text in a “Conference-in-a-Box” and the remaining 218 provided a unique code to download an eBook from Book Shout due to their digital only registration. Utilizing an instructional design model of Catalyze-Connect-Create, participants were first “catalyzed” by hearing a keynote presentation from the author via Zoom webinar, then provided opportunity to participate in structured book club utilizing the platforms of Facebook, FlipGrid, and Twitter. Participants reconvened for a Zoom meeting for question and answer opportunity with the author 5 weeks after the initial contact. The final phase of the instructional design was the open challenge to create a reusable learning objective for the community of learners related to text to earn a voucher for future conferences. Researchers reviewed data provided by a participant post-experience survey, documentation of participants in the

Facebook Group, documentation of participants in FlipGrid engagement statistics, attendance of the question & answer session, submission of created reusable learning objects and reading progress statistics provided by the eBook platform to evaluate relationship between type of access to the text and engagement with professional development activities. Best practices for facilitating professional development conversations between geographically dispersed populations will also be explored.

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Poster

The Sustainability Scholars Program: Early Successes from the Pilot Year

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The Sustainability Scholars Program is a structured undergraduate academic experience focused on issues of sustainability in the food, agricultural, natural resources and/or human sciences (FANH). Experiential learning experiences, such as study abroad, internships, undergraduate research, and service learning, are utilized to develop student workplace skills, FANH career awareness, and leadership abilities. The goal of this project is to create a program to build institutional capacity to recruit and retain underserved populations into FAHN programs; support experiential learning opportunities for students interested in FAHN fields of study; and to develop training for faculty to improve advising and mentoring skills. The program targets first-generation and underrepresented minority undergraduate students and pairs them with faculty who serve as their mentors. The pilot year of the project engaged eight faculty mentors from multiple FANH disciplines and nine student participants. Products include establishment of a Sustainability Scholars Working Group, a mentorship faculty development program, a new Sustainability Scholars Capstone Seminar course, a revised Exploring Citizen in Leadership course, and 9 students engaged in experiential learning projects with a faculty mentor. Outcomes for faculty mentors include enhanced capacity for mentoring. Additionally, through participating in the program students developed new critical thinking skills, the ability to apply new understandings about sustainability to their academic disciplines, and leadership capacity in the areas of sustainability and stewardship.

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Oral

Cross-Race Mentoring: Bridging the Gap

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The recruitment and retention of underrepresented minority student populations has become an emerging priority at Predominately White Institutions (PWIs) such as 1862 Land Grants, however, PWIs fall short of Historically Black Institutions in retention and graduation of African American college students. Within this work, it is important for mentors to understand students' academic development in relation to their experiences as influenced by their ethnic and cultural identity development during their tenure at the institution. Using a conceptual framework based on Bean and Eaton's Student Retention Model and Transformative Learning Theory we conducted an autoethnography to examine our own cross-race relationship as a mentor and mentee to better highlight the possible impacts of mentorship on African American graduate students. Our methodology created an environment where we were able to discuss the factors that impact and influenced our relationship as mentor and mentee. We engaged in a series of audio-recorded discussions and individual personal reflections that were guided by a dually developed protocol. Themes that we uncovered were the cultural shift experienced by African American students, distribution of power within the university system, different scales of transition into the campus community and environment, importance of mentoring the whole student, substantive action towards faculty advocacy, and raising faculty awareness of challenges that African American students face. Our findings can be used by white faculty to help shift the advisor role to a mentor role, becoming more engaged with the totality of what African American students are experiencing at PWIs.

Mentoring Experiences of African American Undergraduate Students Studying Agriculture

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Studies show that mentoring has a significant impact on the educational successes of minority students and the development of their personal and professional identity within their field of study. The purpose of this study is to understand the experiences of undergraduate African American students majoring in agriculture while enrolled at a predominately white land grant institution and explore opportunities for using mentoring as a tool in assisting these students in persisting towards their undergraduate degree. An extensive review of the literature revealed a priori propositions that guide this work, including the likelihood of societal oppression, bias, and assumptions preventing the development of cross-racial mentor and mentee relationships making it hard for rapport and transparency to be the foundation of the relationship; the need for intentionality in creating and sustaining environments that cater to the needs of African American students throughout their entire undergraduate experience, and differing ways that undergraduate students may conceptualize mentoring. The goal is to not only ensure that these students persist towards their degree but that they also develop a sense of community and support within their college environment as they matriculate throughout their undergraduate experience. Mezirow's transformative learning process offers a method for individual reflection within the different stages as they discuss their experiences. Qualitative interviews guided by the a priori propositions are an important next step in understanding the experiences of African American students in agriculture at predominantly white institutions.

Backward Design to Promote Tangible Outcomes in Graduate Student Professional Development

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Course structure is fundamental in driving student engagement and buy-in, promoting student-focused outcomes, facilitating teamwork, and fostering professional skill development. Active learning is one technique that can help instructors support these outcomes. In the sciences, there is increasing demand for graduate students to develop professional and leadership skills, yet few courses provide a design framework that empowers students to work towards personalized, tangible outcomes. Recognizing this challenge, we utilized a backward design approach to prioritize active learning in a professional development classroom. Working as a faculty-student team, we developed an eight-week course for graduate students in an interdisciplinary life science program. The design process was characterized by three phases: identification and prioritization of learning outcomes, creating the syllabus and schedule of topics, and development of classroom activities and assessments. We used a sticky wall and dot method to prioritize topics and group them into twelve learning objectives with three overarching topical themes. Learning objectives were matched to categories of Bloom's taxonomy of learning domains in order to develop measurable outcomes. The design team met weekly to pair in-class and at-home activities to knit together the activities with the learning objectives. Self-reported definitions of success changed throughout the course, and reflective writing statements highlighted specific topic areas and activities that students found most valuable for professional preparation. The backward design approach provided a mechanism for making a course seem more relevant to students, making our design framework translatable to other classrooms.

GLAGjr: Digital Innovation to Connect Educator Professional Development with Youth Organization Programming

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Literature widely documents that youth and international development are inextricably tied together, specifically when in consideration of global issues/challenges. The U.S. has effective youth agricultural organizations like 4-H and FFA. Youth organization success is generally dependent on adult leader involvement. After four years of conducting educator professional development on global learning, the Global Teach Ag! Initiative responded to participant feedback and piloted a program called, "GLAGjr" with the primary intent of connecting the professional development experience the educator was participation to an application opportunity for youth they educate. The pilot ground had 21 youth groups from 12 different states. To be eligible to participate, the youth group had to have an adult leader who was registered for #GLAG19: Cultivating Empathy in a Global World. The pilot program utilized the following technology platforms: Google Documents, Flipgrid, YouTube and Padlet. Platforms were chosen that were widely accessible and available at no cost. Participant groups were provided two distinct lesson engagement opportunities: Global Learning in Domestic Settings and Global Learning Abroad. Participants were provided the opportunity to respond to a request for proposals for mini grants in the amount of \$500 each. One grant was to further domestic global learning activities and the other grant was to advance immersive experiences. Participant perspectives were capture with structured interviews. Engagement statistics were reviewed on all digital platforms. Best practices on navigating accessible learning on technology platforms for secondary students will be shared.

Connecting with Students through Infographics

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Students enrolled in OSU's Introduction to Animal Science course represent a new generation of students that heavily communicate via social media. As an infographic can transfer knowledge about a subject matter faster and more effectively than text alone, infographics may be an effective method of introducing and simplifying complex material for today's students. The purpose of this study was to evaluate student perception of nitrite-embedded packaging improving the surface color of beef steaks before and after exposure to two different infographic formats containing equal content. Surveys were randomly allocated and emailed via Qualtrics to students (n=391) enrolled in the 2018 fall semester of the Introduction to Animal Science course. These surveys utilized a pre-questionnaire to evaluate students' initial perception of their knowledge of beef color and nitrite-embedded packaging followed by access to either: 1) a static infographic presented as a still image containing annotated graphics, 2) a forty-six second video infographic containing audio and animated graphics, or 3) both infographic formats. A post-questionnaire was used following exposure to their respective infographic to evaluate changes in perception of knowledge. There was a significant difference ($P < 0.05$) in the students (n=288) pre- and post-questionnaire self-assessment of their familiarity with nitrite-embedded packaging using a Likert ten-point sliding scale (0=Not familiar at all / 10=Extremely familiar); pre: ($\bar{x}=3.18$) and post: ($\bar{x}=6.46$). There was no significant difference ($P=0.225$) between the type of infographic to which the student was exposed suggesting infographics a useful tool in introducing students to complex material.

Integrative Use of an Incubator Farm Class Project to Enhance Student Engagement

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An Incubator Farm project was designed and implemented in an introductory course on organic and sustainable crop production at the University of Florida during the fall 2018 semester in response to students' feedback about integrating agribusiness management into the class group projects. Each group of five to six students assumed the role of a beginning farmer to start and operate an experimental Incubator Farm in the Vegetable Teaching Garden on campus by addressing specific farming management goals. Each team was required to set up an online blog to document farming progress on a weekly basis and produce a two-page pamphlet and a five-minute video upon project completion. Concepts of marketing, business planning, and budgeting were also integrated into lectures. Forty-four students participated in the post-then-pre assessment at the end of the course by reporting their perceived levels of knowledge, skill set, and interest before and after conducting the project using a 5-point scale (1 = low, 5 = high). Analysis of students' responses to this 27-question evaluation indicated statistically significant knowledge gain and skill development in all assessed areas. Overall, students perceived the greatest levels of knowledge gain in the areas of growing vegetable crops organically, setting S.M.A.R.T. goals to start a vegetable farm, and using intercropping systems and cover crops for organic vegetable production. The positive impact on teamwork and problem-solving skills and motivation in conducting organic farming research stood out regarding skill and interest development. This Incubator Farm project containing an agribusiness curriculum effectively enhanced active learning and student engagement.

Using Gamification to Incentivize Student Preparation for a Laboratory Course

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Gamification is promising as a tool for student engagement in higher education settings. This study was conducted to evaluate whether gamification influences student completion rates of optional pre-lab questions, and to quantify any resulting changes in student performance. We conducted this study in an introductory soil science course that uses the open-source Soils Laboratory Manual. The study involved 185 students in nine laboratory sections in the spring and fall 2018 semesters. Two treatments were imposed on each lab section at the beginning of a lab period – a trivia game announced prior to lab, or a standard brief oral review of the material. The trivia game was modeled after “pub trivia”, creating competition between students at six different lab benches with trivia questions based on the pre-lab questions. The labs were randomly assigned a treatment at the beginning of the semester, and then the labs were rotated in sequential order until all lab sections had played the trivia game an equal number of times. Student performance was determined by online quiz scores following each lab period. Completion rates of pre-lab questions were determined through a zero-point survey question included at the end of each online quiz, and again at the end of the semester as part of a student survey. Data analysis is ongoing. We hypothesize that the announced trivia games increased student completion rates of the pre-lab questions, and that greater completion rates of pre-lab questions were associated with greater performance on quizzes.

Agricultural Science is Restored at Auburn University

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The first seven graduates of Auburn University in 1876, (formerly, Alabama Agricultural and Mechanical College) received B.S. degrees in Agricultural Science. This general agricultural degree served many students by preparing them for careers in production, sales, marketing, research, and education. However, in 1986, with the creation of a new college several departments exited the College of Agriculture and this degree was dropped. Subsequently, many former graduates voiced their displeasure with this decision. Over the past 20 years, stakeholders expressed a need for the Ag Science degree to be restored. The Alabama Farmers Federation, former graduates and AgriScience education faculty lobbied the College of Agriculture to restore the degree. The rationale was that in Alabama a general agricultural degree is needed because of our diverse agriculture production. An ad-hoc committee was formed under the leadership of the College of Agriculture Dean Paul Patterson and Dr. Brian Parr, former faculty in AgriScience Education. After four years of working through layers of evaluations and approvals, the Alabama Commission of Higher Education approved the new B.S. curriculum in Agricultural Science. The curriculum was designed to ensure that AgriScience Education majors (housed in the College of Education) could receive a double-major option in Agricultural Science. Since the Agricultural Science degree was launched in the fall of 2017, with five students, enrollment currently stands at 56 with increasing demand evident as we approach our 3rd fall semester. As expected, the recent graduates have had several career-track job offers along with internships and opportunities for graduate school.

Global Guides: Defining Teachers' Viewpoints About Global Food Security

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Global issues related to food security have been identified as exceptionally important for educators by entities like the USAID, Feed the Future, and the United Nations through learning agendas and knowledge platforms. We sought to determine how secondary educators prioritize the issues identified by these organizations. We used Q Method, a systematic study holistic evaluation of perspectives, to characterize educators' viewpoints of issue priorities related to global learning in food security. The educators were participants in the pilot professional development program of The World Food Prize Foundation. The participants represented 15 states and two countries and were asked to sort 36 statements into a forced distribution from 'most important' to 'least important'. Then we used factor analysis to identify and characterize five distinct viewpoints (or factors) that explain 59% of the variance in perspective on the topic. For each viewpoint, we developed analysis-based personas: Conservative Conservationists, Enlightened Equalitists, Planners and Deliverers, Educators who Empower, and Mindful Producers. Further, we identified consensus statements (items consistently sorted regardless of viewpoint). These viewpoints should be considered in designing and implementing curricula for educators about food security and serve as descriptors for characteristics of thought camps in complex global issues. Lastly, these viewpoints may be a tool to identify gaps in the knowledge base and curricula in global learning, food security, and related sciences.

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Oral

Bootcamp Microbiology Labs: An Approach to Deliver Essential Labs in Online Programs

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The Microbiology and Cell Science program at the University of Florida compressed two standard 16-week microbiology lab courses into five-day versions, which are referred to as bootcamp labs. The bootcamp labs have the same objectives, activities, and assessments as their traditional counterparts. Development of the bootcamp labs is part of an ongoing effort to increase access to STEM. The results of this mixed-methods study include a direct comparison between bootcamp and traditional lab format as an approach for delivery of a face-to-face lab course. The bootcamp lab cohort has a greater diversity of students with more women and underrepresented minorities in STEM than the traditional semester-long cohorts. Students in the bootcamp labs have comparable grade outcomes and learning gains as students in traditional lab format. Regression analysis identified GPA, but not lab format, as the most significant predictor of success for students enrolled in lab courses. Qualitative results suggest that the bootcamp format may be a better way than traditional formats to teach microbiology lab. In summary, the results demonstrate that a bootcamp version of a face-to-face microbiology course is just as effective as the traditional semester-long version. This work has broader impacts as it supports the bootcamp lab approach as a model in STEM education for increasing access and for overcoming a major barrier to online STEM programs: face-to-face delivery of key lab courses.

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Oral

Growing Servant Leaders through LEAD

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The University of Maryland Extension's leadership development program, "LEAD Maryland" has completed 20 years of identifying and developing 224 adult leaders. LEAD awarded two-year fellowships to selected participants, forming 10 classes of 20 to 25 emerging leaders from diverse agriculture, natural resources, and rural communities with half of each class composed of farmers, growers, or producers. Each class participated in a series of educational themed seminars revolving around the state's agriculture, natural resources and civic leadership. These in-person, multi-day interactive experiences were guided by Extension, agricultural related industry, civic and service leadership professionals. In addition to a class-designed culminating project, each class of fellows completed a collective international travel trip to explore the agriculture, natural resources, and civic leadership within designated country(ies) in addition to examining cultural sites unique to the site(s) selected. This descriptive research examines the contextual learning experiences of fellows via an online follow-up survey. Fellows reported gaining an appreciative knowledge of agricultural practices outside of their own occupations, varied development of communication skills using traditional and modern techniques, greater confidence to engage with civic leadership to solve problems impacting public issues and policy. Likewise, through their interactive and reflective learning experiences they identified resources to engage and educate the public, shared current lessons in new leadership roles or interest to acquire leadership roles. Ultimately, the ability to network within the fellow's LEAD class and access to meet other LEAD alumni at social events were cross themed as foundational in their leadership development.

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Poster

ACES: A Residential Learning Community Celebrating More than Ten Years of Success at Iowa State University

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Freshmen learning communities have been shown to help increase student retention at several universities, including Iowa State University. However, many of these communities are discipline specific and course based. Few are residential learning communities, and rarely do they integrate students from different majors. The ACES (Agriculture Community Encourages Success) learning community has been a residential learning community at ISU for more than 15 years. During this time, 60 students (30 male and 30 female) from different majors across the College of Agriculture and Life Sciences have enrolled in ACES each year. In the last decade, the two-year retention rate for these students has been more than 80%. In addition, the ACES learning community is one of the first learning communities to fill, often a year before students are expected to attend ISU. This learning community features exposure to diverse aspects of agriculture in monthly meetings and outings. Discussion of the basis of success and retention and graduation rates from the past 10 years will be presented.

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Poster

The Impact of Healing Gardens on Medical Professionals in Healthcare Facilities

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The therapeutic benefits of gardens and how these benefits impact human health is a relationship that has been analyzed since the 19th century. The recent curiosity of healing gardens within medical settings has opened a new wave of interactions between people and the natural environment. The purpose of this study was to validate an instrument to assess healing garden users' perceptions of a healing garden's social benefit and overall effectiveness. This study included the following objectives: 1) Identify employee perceptions of the overall efficacy of the healing garden, 2) Identify employee perceptions of how the healing garden affects their work environment and 3) Identify employee perceptions of the social benefits of the healing garden. The population included 216 medical professionals; 96 doctors and medical students at the Medical University of South Carolina and 120 doctors and nurses at the Greenville Health System. The researcher-developed survey had a response rate of 49%, with a total of 107 participants. The majority of the respondents indicated they used the gardens at some point during their work week and that the gardens had a positive impact on them. A total of 65 (60%) respondents spent between 5 to 30 minutes and 11 (10%) devoted more than 30 minutes when they visited the gardens. Future studies should include interviews of medical professionals as well as patients and visitors to gain a deeper understanding of the impact the gardens in a medical setting make on the overall emotional and physical wellbeing.

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Poster

Connecting Classrooms: Enhancing STEM Integration of Pre-Service Agriculture Teachers

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Curriculum for Agricultural Science Education (CASE) purposely highlights how agriculture has science, technology, engineering, and math concepts (STEM) embedded in the discipline. CASE training integrated into pre-service instruction has a positive outcome on future teachers' knowledge, ability, and confidence to teach STEM concepts. The K-State Agricultural Education program began integrating CASE certification of pre-service teachers in fall 2016. While the integration was successful, the faculty determined there were areas in need of enhancement, specifically the implementation of a visiting professional's program, funded by a grant from DuPont Pioneer. This program supports current high school CASE-certified teachers to spend time modeling how they teach specific lessons to the pre-service teachers. During the months of September and October, the Visiting Professionals taught eight CASE lessons to the pre-service teachers (10 lessons in 2018). In November, the pre-service teachers were assigned a local school and specific class to teach two days of CASE lessons. This program has been done twice (Fall 2017 & 2018) with a total of 38 pre-service teachers and 18 CASE teachers. Visiting professionals could also 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 STEM faculty in the COA. 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 teachers and content, specifically STEM integration/enhancement.

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Poster

Student Leader Needs Assessment: Connecting Undergraduate Needs to Program Objectives

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Colleges of agriculture have the responsibility to ensure students are prepared to meet the demands of a changing agricultural industry. This requires providing students with a holistic education that engages students in problem-solving and critical-thinking activities that extend outside the classroom. Leadership programs at the collegiate level are often a method for providing these opportunities. Quality leadership programs emerge from institutional contexts and the environment. Therefore, a needs assessment serves as a critical first step in understanding the needs of the students and opportunities for creating appropriate programming. To explore the needs of students in the College of Agricultural and Life Sciences at the University of Idaho, we conducted a case study to identify leadership development influences and assess the leadership needs of undergraduate student leaders (n=17). The sampling method for this study was a census of undergraduate club and organization presidents in the College of Agricultural and Life Sciences. Utilizing this population allowed us to explore the perspectives and recommendations of current students viewed as leaders in the college. We conducted in-person, semi-structured interviews and open coded transcripts to find emerging themes. Participants provided an explanation of their experiences and viewpoints regarding leadership development and provided their perspective on the college's role in developing leaders and needs that exist therein. Several participants were not aware of resources available to them, others recommended conferences, student leader discussion events, leadership seminars, and/or a speaker series. Conducting this needs assessment enabled us to provide recommendations and develop program objectives directly related to student leader needs in the College of Agricultural and Life Sciences.

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Oral

Farm Animal Biosystems: A Freshman Course Providing Scientific Foundation in the Animal Science Major

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In contrast to animal science students of the past, today's student population comes from highly diverse culture and socio-economic backgrounds, entering college with a range of life experiences and professional aspirations. To address these changes a data-driven, student-centered curriculum study was conducted. Stakeholder (comprised of industry members, faculty, current and former students) surveys (n=289) served as a foundational component of the study. Survey responses revealed the existence of a gap between student knowledge and skills, and faculty expectations upon entering disciplinary core courses, which were deemed necessary to gain proficiency in areas identified by industry stakeholders. To address an identified gap in physiology a new freshman level course, Farm Animal Biosystems, was created. This course incorporates departmental learning outcomes and utilizes teaching methods and assessments suitable for a large sized course (>300 students). Further, it is taught in the same semester as a complementary laboratory-based course allowing a team approach to addressing the disparity in student background knowledge. Rather than assuming a standardized level of knowledge, key areas have been identified and separated for individualized focus in order to provide students with a solid foundation in the scientific components of the discipline. Successful completion of this course will enable students to enter specialized disciplinary core classes with a more uniform knowledge base, thus promoting success throughout the curriculum.

Understanding the Motivations of Horticulture Students that Participate in Short-Term Faculty-Led Study Abroad Programs

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Developing skills to be competitive in a global society is important for students. In the last decade, the number of students gaining international experiences at Kansas State University (KSU) has increased. In the Horticulture and Natural Resources (HNR) Department, faculty led study abroad programs are generally offered every other year. A research study was implemented for two faculty led study abroad experiences to Western Europe. The objective of the study was to learn about horticulture students' factors and motivations towards faculty-led study abroad experiences. Pre-and post-trip surveys were administered. Students rated several factors in their decision-making process for participating. Using a Likert-scale (4 = very important; 0 = unimportant), students rated how important the trip was for them to "develop or improve horticulture skills". The average response in 2014 was 3.4 (n=14) pre-trip compared to a 3.5 (n=12) average post-trip and in 2017, the averages were 3.5 (n=11) and 3.6 (n=7), respectively. Students reported their preparedness as a global citizen, using a Likert-scale (0 = not at all prepared; to 4 = very well prepared). The average pre-trip response was 2.0 (n=13) compared to 3.0 (n=11) post-trip. Similarly, results were observed in 2017; the pre-trip response was 2.2 (n=10) and 3.0 (n=7) post-trip. The average increased both trips, indicating the international experience had a positive effect on perceived global citizenship. Our findings provide valuable insight into how to better design and deliver faculty led study abroad courses to assist in global horticulture and professional skill development in undergraduate learners.

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Oral

An Interdisciplinary Approach to Developing an Online Humanities Course in the Context of Agriculture

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As competition for student credit hours becomes more aggressive at many institutions, the development of interdisciplinary teams to address diverse curricular outcomes will become increasingly important. It is often challenging for students in agriculture programs to find humanities courses in the context of agriculture. To address this issue, an interdisciplinary team of animal scientists, instructional designers and equine historians developed a course to fulfill requirements in humanities and international understanding. The team developed learning outcomes blending the science aspects of the role of horses in human culture and society with the critical role horses have played in the development of human society and culture. Course objectives were to: 1) Survey the historical record of horses from antiquity to the present, 2) Trace the origins and development of the horse and human interactions and its relationship to modern civilization and culture, and 3) Cite evidence for how horses have influenced modern society. A systems approach, and templates developed for the collaborators to provide material, focused content areas for course development. The lead instructor and the instructional designer incorporated the material provided by the interdisciplinary team into a cohesive course using the e-learning course development software Articulate Storyline 360®. Reading assignments were administered through Perusall®, a third-party software that allows in text annotation and discussion of topics related to the readings. Successful development of courses meeting multiple plan of study requirements for students will enable colleges of agriculture to maintain and grow student credit hour metrics in an increasingly competitive environment.

Second-Year Engagement: A Theoretical Examination of First-Generation College of Agriculture Students

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Literature provides a foundation for discussing the pervasiveness of first-year experience programs across colleges and universities nationwide. While these programs are contributing to increased retention of first-year students, research has also been used to show that students are leaving college at a high rate after the second year, in part, due to a lack of continued support. The negative stressors of college are potentially more deleterious to first-generation students who lack the support structures to cope. The novel population of first-generation, rural students are often over-represented in colleges of agriculture as compared to their counterpart colleges. A dearth exists in research for describing the experiences of first-generation, rural, second-year college students. Such an absence of research inhibits development of support systems for this novel population. Austin's (1991) Input-Environment-Outcome theory, aligned to the stages of Schlossberg's transition theory guided this inquiry. These theories, when examined critically, simultaneously offer a framework for discussing student engagement in college education. The purpose of this study is to acquire knowledge for describing the unique experiences that perpetuate the varying levels of student engagement for first-generation, second year students in a Midwestern college of agriculture. This research will contribute to defining variables that can potentially be used to predict student engagement, retention past the second year, and persistence to graduation for the target population.

Challenges and Elements of Success of Undergraduate Research: Students' Perspective

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Undergraduate students in Agriculture are often hesitant to get involved in undergraduate research projects. In order to discover the underlying reason for this, we conducted a survey of students from 3 different groups. Group 1 consists of Agriculture majors, group 2 contains Agriculture majors involved in the McNair Scholar's Program, and group 3 includes undergraduate students involved in research with majors other than Agriculture. Through this project, we hope to learn why undergraduate students in Agriculture are not often exposed to conducting research. Undergraduate research in Agriculture provides an avenue for students to gain deep experiential learning and conducting experiments with a topic related to their specific field of study. The students are exposed to how and why the studies are developed and can help solving local, regional or global problems that currently need to be addressed. Working and collaborating with a faculty mentor provides the student direct mentoring at a one-on-one level. Undergraduate research also provides an opportunity for faculty mentors to guide the students to explore career opportunities that they may not be aware of. Agriculture students are missing these excellent advantages because they do not conduct research. We hope to identify and remove barriers to undergraduate research in agriculture through the results of this study. Recommendations are still in process and will be presented on the poster.

Using Mixed-Method Needs Assessments to Bridge the Gap between Extension and Urban Farmers

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The idea that urban farms are a potential solution to urban food security and diet-related disease is increasingly popular. A mixed method needs assessment allowed for deeper investigation and triangulation of urban farmer needs with survey methods used to describe the perceptions and knowledge of agricultural extension agents about urban farming. The findings of the study explain 1) the local context of urban farming, 2) the needs of urban farmers, 3) the perceptions of urban farming by agriculture extension agents, and 4) identify any gaps in perceptions between the two populations. The study blended the theories of the Agro-Ecological Educator and Builder, Weaver, and Warrior Work with the Community Development Framework for Change to understand potential avenues for relationship building between Extension and alternative farmers, which is critical for non-formal educational efforts and program planning for Extension. This study determined a regional definition of urban farming as small-scale, diversified farms under ten acres in the city limits that engage with markets, the community, or both. Qualitative results include descriptions of major needs and concerns of farmers, descriptions of practices, and desired trainings and other non-formal educational programs to assist with these practices and concerns. The results of the survey of agriculture agents situate the qualitative results within the context of the entire state. Understanding the regional context for urban farming is critical for curriculum development for Extension programs. Recommendations for practice include utilizing these mixed method needs assessments to determine local contexts and needs of urban farmers in each state.

Redesign and Reframing a Foundational Graduate Course for Agricultural Education, Extension and Communication

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Small interdisciplinary departments containing units such as Agricultural Education, Extension Education, and Agricultural Communication, are often faced with challenges meeting the graduate course needs of their students. Increasing pressures to meet minimum course enrollments at many universities further adds to the issue. Developing new or converting existing graduate courses to online delivery is an increasingly common manner to address those needs. Transitioning traditionally taught courses to quality online courses often requires a complete re-conceptualization of teaching and learning strategies used by the instructor. Utilizing the expertise of a senior instructional designer collaborating with the lead instructor, an introductory graduate course was revised using backward design to transition to online delivery format, while maintaining the valuable components of student discussion and interaction. Teaching the foundations of the principles of any discipline warrants a thorough discussion of the history, along with situating that foundation in the context of present day. Therefore, course objectives focused on 1) compare and contrast the disciplines regarding their past present and future, 2) evaluate the integration among and across of the disciplines, and 3) identify and examine current trends and grand challenges facing the disciplines. Innovative interaction between students was created with several e-learning tools, such as Articulate StoryLine 360® for content delivery, and Perusall®, a site that allows for interactive annotation and discussion of readings. Student feedback from the first semester indicated the course provided a wide range of material and resources and facilitated more discussion between peers than in other online classes.

A Q-Methodological Study of the Perspectives of American Agriculture Culture Held by Students at a Land-Grant University

Jorge Gonzalez and Marshall A. Baker
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This Q methodological study is an investigation on the subjective perspectives on the culture of American agriculture existing for students enrolled at a tier 2 research institution. Twenty-nine Students of various ethnicities and backgrounds sorted forty-two statements derived from a structured one by six concourses of communication. The concourse was developed using Hofstede's Six Dimensions of National Culture, which included: a) power distance, b) uncertainty avoidance, c) individualism vs. collectivism, d) masculinity vs. femininity, e) long- vs. Short-term orientation, and f) indulgence vs. restraint. The condition of instruction was: "In my opinion, American agriculture is..." and analysis was conducted through Q methodological procedures including correlation, factor analysis and standard score calculation for statements within factor arrays. Three perspectives were interpreted as: Progressive Agriculture, focused on a modern and future-oriented perspective on American agriculture, Conservative Agriculture deemed American agriculture as socially restrictive, and Traditional Agriculture provided a unique perspective viewing American agriculture as set in its ways. Conclusions, implications, and recommendations are offered for each subjective perspective described with direct applications for teachers working with diverse populations in agriculture.

Assessment of Core Competencies in a Crop Science Course Sequence

Charlie Watt, Mac Burgess, Perry Miller and Tony Hartshorn
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In the College of Agriculture at Montana State University, we are developing a learning outcome assessment plan to enact competency-based learning and evaluate student preparedness in a sequence of courses required of Crop Science and Sustainable Food Systems students: Environmental Science 245 "Soils," Agricultural Science 341 "Field Crop Production," and AGSC 428 "Sustainable Cropping Systems." Learning Outcomes were previously developed by instructors for these courses with insufficient regard for possible gaps or redundancies in content. Assessment of these learning outcomes and alignment with program learning outcomes has also arisen by convenience and tradition rather than by the effectiveness of assessing desired outcomes. The lack of effective assessment is problematic in this case where courses in sequence build upon each other and ultimately require interdisciplinary thinking. It is also problematic when entry level professional industry standards are not met by graduates. We are developing a new assessment plan across this sequence of courses, with leadership from a third-party graduate student. Our first step is developing a series of online quiz questions appropriate to each course intended to assess specific learning outcomes. To ensure our contrived assessment questions provide valid data, we will provide justification for selected questions and description of methods used to assess scores. Preliminary results indicate that previous assessment efforts have not effectively measured the intended outcomes and thus have left students unprepared for future courses and professional experiences. This research hopes to catalyze department and college wide efforts to improve outcome assessment methods.

CRT as a Lens for Identifying the Significance of Community Education for Food Systems Justice: The Role of Self-Determination in Black Communities

Robert T. Bass* and Kim Niewolny*
Virginia Tech, Blacksburg, VA

Critical Race Theory (CRT) can be an empowering method for comprehensive, critical analysis of the systematically unjust environment that shapes food sovereignty in low-income communities of color.

Inadequate access to healthy and affordable food is historically positioned in rural and urban communities of color. Generational consumption practices are heavily influenced by lack of access and contribute to ever rising disease and illnesses associated with diet. Utilizing CRT, this poster presentation provides a framework to explore the values, beliefs and experiences of Black leaders as organizers and educators providing community-based educational opportunities in agriculture for Black youth. By exercising Narrative Inquiry and Postcolonialism theory as a methodology, the researcher conducted 10 narrative video-graphic interviews in the Triad area of North Carolina, exploring participants' experiences and perspectives on current and historical educational practices for Black youth self-determination as components of food justice. The researcher also explored the micro-aggressive and racial barriers to organizing food and farm educational opportunities with Black youth in their communities. Discoveries demonstrate the complexity and political experiences of Black leaders working toward food justice as a critical form of self-determination. This research provides a much-needed space to illustrate the ways in which Black leaders are creating social change on their own, in their own voices, about the work and what is required of the food justice movement to more equally and equitably distribute power to low-income Black communities in the U.S.

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Poster

Supporting Graduate Research on Social Change with Queer and Trans People of Color

Carmen Dasiana Young* and Jennifer Helms Culhane
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Researchers may be motivated to explore social change by immersing themselves in the research design to make sense of how subjects of interest understand the world. Graduate students engaged in qualitative research of marginalized groups may find themselves observing within unfamiliar environments, requiring considerable attention to be respectful and knowledgeable of new group language and culture. This project presents the preparation of a qualitative study of a group of queer and trans people of color enacting social change through gardening and additional programming. This study will provide information to support graduate students navigating qualitative research involving interaction with queer and trans people of color within intimate community spaces.

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Poster

Comparing Faculty Development and Student Assignment Completion Times for Online Video Module Systems

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Students are often required to complete online modules as a component of learning. The issues surrounding online modules include development time and student engagement. This study was conducted to compare the faculty development time and student submission times for two online video module systems, one which was embedded in the university student management system, and a private video module site, EdPuzzle. We tracked the amount of time required to take pre-developed content (PowerPoints and quiz questions) and have a module ready for students to complete. There were five modules to load for students, each were developed in both online systems. The student management system (bbLearn) module averaged of 76 minutes to upload video and embed the interactive components. The EdPuzzle system was online and ready for students in an average of 36 minutes. Student completion times were also tracked. For students who completed the modules in bbLearn (n=17), there were 18 instances of late submission (submitting after the assignment due date) across the five modules (21.1% of modules completed late). For students completing the EdPuzzle modules n=21, there were 9 instances of late submission for an 8.5% late submission rate. Student comments about the EdPuzzle system suggested that students found the module easier to complete, more engaging to interact with, and novel compared to the standard embedded system. Results of this study allow me to recommend using the EdPuzzle system as a supplement to class instruction when online video modules are used.

How Do They Learn? The Experiential Learning Preferences of College of Agriculture Students

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University of Idaho, Moscow, ID

Researchers have concluded that post-secondary students benefit from experiential learning activities in their educational programs. It cannot be disputed that each student has different preferences for bringing in and processing information. David Kolb (1984) developed a model for experiential learning, and subsequently a method for assessing learning preferences within the experiential model, the Kolb Learning Styles Inventory (KLSI). The KLSI allows respondents to report their preferences for bringing in new information through concrete experience (CE) or abstract conceptualization (AC), and for transforming information through active experimentation (AE) or reflective observation (RO). The KLSI also assigns students to one of nine learning styles based on their results. This study was conducted to examine the KLSI preferences for n=279 College of Agriculture students enrolled in agricultural courses at two land grant institutions. Means for the four components of the KLSI on a 12-48-point scale were: M=30.7(8.6) for abstract conceptualization, M=27.1(7.0) for concrete experience, M=33.6(8.3) for active experimentation and M=28.2(7.1) for reflective observation. Students showed a preference for grasping information through concrete experience, with more students sorting to the "Initiating" learning style (27.6%) than any others. Initiators prefer concrete experience and active experimentation. Understanding student experiential learning preferences could allow faculty members to tailor courses to meet student needs. For faculty members, these findings provide a blueprint for developing high-impact activities, incorporating experiential learning in classes, and advising students into both career goals and out of class activities.

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Oral

Diversity in Our Curriculum: A Photovoice Project in Understanding and Experiencing Diversity at Midwestern Land-Grant University

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Sarah Gordon
Arkansas Tech University, Russellville, AR

Precious D. Elmore-Sanders and Denise Blum
Oklahoma State University, Stillwater, OK

Both the general public and college students have an expectation for universities to provide students with a diverse education. Nevertheless, the longstanding US history regarding diversity and the conservative nature of higher education institutions have made it challenging for institutions to fully embrace diversity and multiculturalism. As a result, students of all races are not attaining the educational benefits of diverse learning environments. Most US higher education institutions seek ways to incorporate general education courses, as well as develop campus organizations, activities, and practices to demonstrate an appreciation for diversity and a desire for intercultural competence. Effective and accurate ways to measure these concepts as learning outcomes has been challenging. The purpose of this study was to assess Midwestern University (MU) students' experiences with learning about diversity during their time at MU. This study was designed to augment the typical quantitative assessment of diversity course requirements by exploring students' experiences with diversity in, and out, of the classroom through photovoice. Qualitative analysis of the five focus groups led to 1,080 individual codes, which were deduced to 74 categories, and ultimately six themes. Initial coding strategies led to six themes: (a) course quality, (b) the MU experience, (c) spaces and places, (d) grouping, (e) responsibility for diversity, and (f) hesitation. Praxis included more training for staff and students, a focus on the pedagogical approach to diversity courses, commitment to institution wide resources and support beyond the traditional "pockets", and the creation of safe spaces and places for healthy dialogue to occur.

No Longer Black and White: Understanding the Experiences of White Agriculture Students Learning about Culture and Agriculture

Cecilia E. Suarez, Annie Muscato, Jarred Shellhouse and Carl Simeon
University of Florida, Gainesville, FL

Agriculture is becoming more diverse and in need of a culturally competent workforce (World Agricultural Economic and Environmental Services, 2014). As educators, it is important for us to be conscious of how undergraduate students preparing to enter the workforce view people from other cultures. Understanding culture's impact and multiculturalism can lead to better working relationships and increased production within an organization. Teaching multiculturalism in agricultural education can encourage students to be better informed and prepare them to work in a field where diversity needs to be valued. Furthermore, multiculturalism can help to raise overall cultural awareness and foster better attitudes toward different cultures. This presentation will share qualitative findings of a study focused on understanding the experiences of white undergraduate agriculture students who completed an intercultural and diversity agriculture course, and what impact, if any the course had on participants. Findings suggest that factors such as teacher empathy, new understanding of personal identity, and understood application of culture to agriculture contribute to the ways in which students incorporate cultural understanding to their daily lives. Objectives of this presentation are to 1) Present study and findings and 2) identify challenges with current practices of diversity education, and 3) share a framework that can be applied to courses at various levels to successfully increase cultural understanding among white agriculture students.

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Oral

Soil Interns of Montana: A Pilot Effort to Connect Our Students to Soil STEM Opportunities

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Montana State University, Bozeman, MT

Bryan Wilson
Big Sky Watershed Corps, Bozeman, MT

Our pilot project represents an extension of numerous public service initiatives, from the international Peace Corps established in 1961, to the state-wide Montana Conservation Corps established in 1991, to the national Americorps program established in 1993, to the Big Sky Watershed Corps (BSWC). Just as BSWC Conservation Interns have contributed to GPS and GIS projects, river ranger patrols, wildlife inventories, data analyses, public outreach and education, trails projects, and invasive weeds management across the Northern Rockies and Northern Great Plains, our Soil Interns will help build soil health capacity by bridging the gaps between producers and soil scientists. Specifically, interns will first interview stakeholders to assemble a needs assessment; collect and analyze soil samples; produce easily digestible, and memorable, reports summarizing data trends; draft supplemental funding proposals; and review their infographic-rich findings with producers to improve decision-making. Interns will receive specialized training in soil sampling, pedology, biogeochemistry, microbiology, and science communication. While this pilot should contribute to the creation of a baseline soils database that might inform future terrestrial carbon sequestration efforts, it should also contribute, in its professional development aspects, to reversing the "brain drain" occurring across many parts of the rural North America. With its formative and summative embedded assessments, it is hoped that this pilot could someday serve as an international model, cultivating interest in soils.

"New Under-Management": Best Practices for On-Farm, Soil-Health-Focused Baseline Characterization

Molly Haviland* and Tony Hartshorn
Montana State University, Bozeman, MT

Growing interest in soil health is paced with interest for robust soil health indices capable of tracking expected improvements in soil. Unfortunately, when a producer decides to alter his or her practices, or there is a change in landowners, few guidelines exist for how best to characterize baseline soil properties in such a way that current or future management practices might be clearly defined. Here we provide an instructive case study based on ~3000 field- and lab-based measurements from an ~800-acre, north-central Montana farm in the Missouri River headwaters. With "new management," several soil physical, chemical, and biological attributes were examined via measurements collected over an 18-month interval and from up to three depth intervals. Sampling densities (SD) ranged from 1.7 to 110 readings per 1000 acre-years depending on the analyte (Pyroxsulam pesticide residues [none detected] and compaction field test in triplicate, respectively). More common laboratory measures included bacterial density estimates (median 117,000 ug g⁻¹; SD 2.4), fungal density estimates (median 154 ug g⁻¹; SD 2.4), pH (median 5.7; SD 0.4), and soil organic matter (median 2.5%; SD 0.4). We did not detect strong patterns between surface soil organic matter and bacterial densities ($R^2 < 0.02$) or fungal densities ($R^2 < 0.05$), which serves as a caution of the potentially large sample sizes that might be required to detect soil-health improvements ("signal") against the large spatial and temporal heterogeneities ("noise"), particularly for more a really extensive farms.

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Oral

Seating Preference and Student Performance in an Introductory Plant Science Course

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Enhancing student engagement and class participation is challenging especially in large class settings. This is particularly true for freshmen level and General Ed courses. Several factors influence students' attention and participation in the classroom. Seating arrangement, particularly in a large classroom setting can be a potential factor influencing student engagement and performance. The objective of the current study was to investigate how the seating location preferences were related to student performance and other features in an introductory plant sciences course. The class had 82 students from various majors within and outside College of Agriculture, Consumer and Environmental Sciences. The classroom was an auditorium divided into 3 aisles and with 14 large rows. About half (54%, n=61) student respondents enrolled were freshmen. More than half students sat either in front or middle rows (53%). More than 2/3rd of the respondents thought the seating location was important to them in the class (31% strongly agreed, 39% agreed; n=61), while only 1/8th of students didn't think seating location was important. Majority of students (72%) thought the seating location had an impact on student learning; and 64% students thought that seating location impacted their grade performance in the class. Most students (56%) indicated paying closer attention to seating location in those classes that they think were important or more difficult. The most important reasons reported for choosing the front seats included being able to: see the slides better; see and hear the instructor better; make an eye contact and better interact with the instructor.

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"abSURD": Can we all Agree to Stop Comparing Rainfall between Locations, Already?

K. McRae and Tony Hartshorn
Montana State University

Many introductory soils students share a misconception: if mean annual precipitation (MAP) is greater in location A than location B, then A's soils must be wetter than B's soils. Of course, B's soils might be wetter than A's soils if A's evapotranspiration (ET) losses are far greater than B's ET losses. This tends to be a difficult concept for students to grasp due to the invisible nature of ET compared to rain and snow. We developed an app and a pedagogic module (abSURD: "abstracted Surplus, Use, Recharge, and Deficit") to clarify the importance of effective precipitation, which we defined as monthly P-ET, which are estimated from PRISM and MODIS products. Our module walks students through how to graph both monthly P and ET, and then to define SURD on a monthly basis using a few rules including a texture-derived estimate of soil profile water-holding capacity. Our review of >300 student blogposts suggests our module generally helped students clarify between effective precipitation and soil moisture regimes, compare SURD between their "favorite soils," and better appreciate how effective precipitation influences soil genetic processes. The module also aided students in understanding the relationship between effective precipitation and agricultural production. Though promising, we also noticed a general lack of critical thinking where earlier versions of our app led to permanent deficits ($P < ET$ for all months) for some semi-arid soils.

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Introduction to Extension and Engagement – A New Experience for Students

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Oregon State University (OSU) is home to the Oregon Extension Service (OES). With a broad base of 400 faculty, OES is mandated to address high priority community issues throughout the state of Oregon. Even with this wider scope of reach, many students at OSU are unfamiliar with OES and the opportunities for career advancement within its structure. The Department of Agricultural Sciences, Education, and Leadership saw an opening to introduce students to this world by offering an "Introduction to Extension and Engagement" course. This three-credit class sparks interest in the broader engagement careers. It also informs students of other opportunities within Extension, e.g. volunteerism, needs assessment, and utilization of publications. The 10-week study course hosts 16 guest speakers from many diverse disciplines in Extension and engagement. Topics cover a broad range of subjects including history, organizational structure, volunteer management, agricultural experiment stations, program evaluation, as well as adult and youth education. Students are also required to incorporate the three main Extension models; technology-transfer, problem-solving, and imparting-knowledge model in class assignments. With new approaches in pedagogy, the course directly addresses many of the 21st-century Extension challenges such as adaption of the Land-Grant mission and loss of the Land-Grant vision. This novel approach in engaging students as part of Extension and engagement imparts knowledge and creates new experiences for students. Furthermore, this approach is easily adaptable to many other universities as a way to integrate and collaborate with Extension programs.

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Poster

Punnett Squares to the Rescue: An Easy Way to Measure and Improve upon Student Learning Outcomes

Lauren Bryant*, Kirby McRae and Tony Hartshorn
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If you've heard of Punnett squares, you're probably thinking about predicting genotypes from a breeding experiment. Here we show their utility in the rapid, multiple-choice assessment of student learning outcomes pre- and post-activity when combined with Plickers. We ran six iterations of a carbon literacy module across four middle or elementary schools and gathered pre- and post-activity responses using free Plickers. Data were downloaded as comma-separated value files, imported into R, and graphed as Punnett squares, with each quadrant representing one of four possible outcomes, starting at the upper right and moving clockwise: pre true (T), post T; pre-T, post false (F); pre-F, post F; and pre-F, post T. The desired learning outcome, with respect to any educational activity, is that pre responses will be dominantly answered incorrectly (F) and that post responses will be dominantly answered correctly (T). The beauty of

Punnett squares is they provide a quick diagnostic on the combination of question rigor and/or activity. During one of our middle school experiments, we learned that three of our five questions were not sufficiently rigorous, as most students answered the questions correctly after the activity... just as they had "before" the activity. We will share the code used to graph the Plickers data as Punnett squares.

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Oral

Connecting the Dots: Applying Creative Thinking Strategies to Expand Agricultural Research Courses

Shannon L. Norris*

Texas A&M University, College Station, TX

Teaching students to foster creativity in the classroom is critical. Activating creative tendencies also advances critical thinking skills and emotional growth. Empowering students to become engaged with course content and to take responsibility for learning outcomes are two products of learner-centered, critical thinking. Practicing abstract thinking as a class exercise is one strategy to increase critical and innovative thinking in a classroom. Abstract thinking typically challenges the learner to think about the connections and relationships shared between multiple objects, phrases, concepts, or ideas. Therefore, to help students build creativity in the agricultural, scientific writing course in the College of Agriculture and Life Sciences at Texas A&M University during the summer 2018 semester, I used abstract thinking exercises, such as completing outlines, connecting dots, and drawing connections to encourage students to think creatively about completing each image. After each abstraction drawing was complete, students connected the research topic's lesson to the images drawn. As the course progressed throughout the summer, the abstractions became more difficult and obscure, and to activate higher order thinking skills, students also had to defend why each completed abstraction connected to their role in scientific research writing and to agriculture, food, and natural resources. Addressing challenges in the food, fiber, and natural resource industries requires students to seek solutions and defend connections to the field. Strategies to practice abstract thinking is also one way to encourage innovative thinking to addressing unique needs within the STEM fields.

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Does Exam Proctoring Software Deter Cheating on Online Exams?

Kyle J. Stutts*

Sam Houston State University, Huntsville, TX

One of the major concerns associated with online course delivery is integrity of online exams. The objective of this study was to evaluate the efficacy of two different software packages that were utilized to maintain integrity during exams administered online. Exam scores of 152 students were analyzed to determine the effectiveness of the software. All exam scores (four per student) were collected from a single online course over six semesters. Exams contained similar questions over similar content for all semesters. Students were instructed to prepare for the exams and complete the exams as if they were sitting in a classroom --- no notes, no phones, and no help from friends. During three of the six semesters, a lock down browser was utilized to deter cheating on exams. During the other three semesters, students completed exams using a proctoring software employing a webcam that recorded their actions as well as recorded their computer monitor while they completed the exam. Data were analyzed using a one-way ANOVA to determine differences in scores on each exam and overall. Exam scores were lower ($P < 0.001$) on all four exams for students that completed the exams using the proctoring software. The overall average exam score using the proctoring software was 77.5 ± 11.7 compared to an average score of 86.6 ± 8.2 for students using only the lock down browser. Based on these averages, the proctoring software is more effective at maintaining student integrity when completing online exams.

Enhancing Student Engagement with Fishbowl Discussions

Tim Buttles*

University of Wisconsin – River Falls, WI

The fishbowl discussion method provides a structure for discussions that keeps the discussion focused while engaging the whole class. The variation used in this example starts with a panel of five to seven students discussing the assigned topic while the rest of the class observes. After approximately 15 minutes the students in the audience can engage in the discussion. Students sign up at the start of the class to serve as a panel member for one discussion. Panel members write a two to three-page position paper prior to the discussion. Each fishbowl discussion opens with a 30 second opening statement from each participant. The panel discusses the topic for approximately 15 minutes. The audience is then allowed to participate in the discussion for approximately 15 minutes. Panel members then have 1 minute to prepare a 1-minute closing statement. The discussion will conclude with closing statements from all panel members. Following the discussion, audience members complete a written assignment for each discussion that includes an advantages/disadvantages table and one to two-page summary and evaluation paper. Each item listed in the advantages/disadvantages table includes the name of the person who first stated that idea during the discussion. The summary paper includes highlighting the most convincing advantages and disadvantages from the discussion, describing any additional advantages or disadvantages not raised in the discussion, and closing with the student's personal recommendation to either adopt the proposal or an alternative proposal. The format helps keep both panel members and the audience focused on the discussion.

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Oral

Is the SOC Emperor Wearing any Clothes?

Tony Hartshorn

Montana State University, Bozeman, MT

The recent explosion of interest in soil health represents an extension of decades of prior interest in soil quality, stretching back at least as far as Sir Albert Howard's "The Soil and Health" published in 1947. As practitioners have sought to clarify which combination of soil properties are most easily measured, and which provide the most sensitive indication of management practices, or shifts therein, much emphasis has been placed on soil organic carbon, particularly as it underscores the potential for terrestrial atmospheric carbon sequestration. Unfortunately, few guidelines exist for how to report soil organic carbon, with prominent outlets using mass-based units (e.g., %), or mass-per-unit-area units (e.g., Mg ha⁻¹). Neither of these systems is appropriate. This presentation will review best practices for teaching the complexities of soil organic carbon, from its measurement to its estimation, to its inverse relationship to bulk density, to the divergent mathematical approaches most likely to be of relevance to a student and producer (e.g., equivalent soil mass, volume/mass corrected). Worked examples and case studies will be provided.

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Wild Clay: The Melting Point between Art and Science?

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Montana State University, Bozeman, MT

In 2017, we piloted two courses focused on wild clay from southwestern Montana. Wild clay processing was led by students and included the harvest, preparation, and firing of clay pieces. Beyond these processing steps, our initial for-credit offering featured laboratory tours of an x-ray diffractometer and scanning electron microscope; a tour to a public, clay-focused educational institute; field trips for materials; and a summative gallery showcase where all students displayed pieces together with posters comprising artists' statements. For our second, non-credit offering, Soils students again prepared the materials and

then prepared art pieces, including obligatory cows as tokens of appreciation for an unrelated rancher-outreach effort. All students completed either blogposts or summative reflections, with one student remarking “Wild clays was the best thing for my mental health that I have done since I moved to Montana over three years ago. Working with clays is such a calm and relaxing process.... How often can I say that I have something that I truly worked for...? That’s empowering as hell.” We outline recommendations for future wild clay offerings.

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Oral

Spanish for Agriculture - ¿Como lo enseño?

Bruce Richards
Delaware Valley University, Doylestown, PA

According to the Bureau of Labor Statistics, 23.1% of laborers in agriculture, forestry, fishing, and hunting were Hispanic or Latino in 2014. Spanish speaking skills will benefit students entering agriculture fields. “Spanish for Agriculture” was offered four times at Delaware Valley University over the last three years. The purpose of the course is to provide basic conversational skills and agriculture terminology to students. Emphasis is placed on communicating with native Spanish speakers in an agriculture related work environment. Students in animal science, dairy science, plant science, turf management, and agribusiness have enrolled in the course. To accommodate the variety of interest, students are responsible for creating their own vocabulary lists related to the topic of the day. The mid-term assessment is a 2.5-minute oral presentation, and the final is a 5-minute oral presentation in Spanish. A rubric was developed and used for grading the oral presentations by the instructor with collaboration from native-Spanish speaking colleagues. Other course activities include students giving “tours” in Spanish of the campus farms, greenhouses, and putting green, lunch with native Spanish speakers, and student led activities with instructions given in Spanish. Former students, now working with Spanish speaking coworkers, report the course to be beneficial. Students with no other Spanish language training ask for more grammar and sentence formation to be included in the course. This course expands communication skills and cultural awareness among students.

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Career Progress of K-State Golf Course Management Alumni from 1978 to 2017

Steven J. Keeley* and Jack D. Fry
Kansas State University, Manhattan, KS

Changes in the golf economy over the last 40-plus years have likely had impacts on the career progression of students graduating with golf course/turfgrass management degrees. Therefore, we sought to understand how career progression of our graduates has changed over time by surveying golf course/turfgrass management alumni who graduated from 1978 to 2017. A Qualtrics survey was sent to 520 alumni via postcards and emails containing a QR code and a url link/address. Two-hundred-twenty-eight surveys were returned, for a response rate of 44%. The survey guided respondents through a series of questions that enabled them to give a complete work history since graduation. Sixty-one percent of respondents graduated from 2000-2009, corresponding to the years of peak enrollment in turfgrass programs nationwide; 11% graduated from 1979-1989, 14% from 1990-1999, and 14% from 2010-2017. The standard entry-level job in golf course management has traditionally been the “first assistant superintendent”. While graduates from 1979-89 were more likely to be hired in this role (71%, n=14), the percentage differed only slightly among graduates from 1990-99 (46%, n=24), 2000-09 (36%, n=96), and 2010-17 (42%, n=26). “Golf Course Superintendent” is the ultimate career goal for most students. Contrary to popular belief, the median number of years elapsing until becoming a superintendent was not greater for more recent graduates: For 1979-1989 graduates, it was 2.8 years (n=10), for 1990-1999 it was 5.3 years (n=20), and for 2000-2007 it was 3 years (n=46).

Empowering Native American Forest Management through Forest Business Education

Jacek Siry*, Pete Bettinger and Rocio Gutierrez
University of Georgia, Athens, GA

The Warnell School of Forestry and Natural Resources at the University of Georgia received a National Needs Fellowship grant in late 2018 to support career preparation for Native American leaders in forest business management. The program was developed in close cooperation with the Intertribal Timber Council. The purpose of this presentation is to introduce the program's objectives and describe unique approaches developed to address forest leadership challenges experienced by tribal forestry programs. This process began with the needs assessment and was followed by the development of a suite of educational and experiential learning approaches designed to meet identified challenges. Great care was taken in developing recruitment plans, selection processes, and unique educational approaches. The program is prepared for applicants who may be inadequately prepared for college, addressing academic preparation through preliminary assessment, enrollment in undergraduate courses if so required, and other mentoring approaches. Time management is challenging with course loads, emphasis on academic excellence, and several experiential activities. The program envisions two paid summer internships, one with a leading land management organization or government agency and another with a tribal forestry program. Strong support services for Native American students were developed. An equally important aim of this presentation is to advertise this opportunity and interact with potential applicants to provide them with pertinent information and answer their questions.

The Meaning of "Sustainability" to Foresters and Planners: Survey Results

Rocio Gutierrez*, Pete Bettinger and Jacek Siry
University of Georgia, Athens, GA

Sustainability has always been a cornerstone of North American forestry. Governments, non-profit organizations, companies, and individuals have been seeking to achieve forest sustainability in one form or another to balance environmental health and human well-being with economic necessities. It is indisputable that both concepts "sustainability" and "forest management" are context specific, and factors such as the demands on forest products and services and the need to protect biological diversity drive the discussion of land management. Consequently, the concept of forest sustainability has evolved over time from a focus on timber production to a more inclusive approach that focuses on the state of forest ecosystems. Having in mind that sustainable forest management is a determinant piece in advancing sustainable development, this study aims to assess how sustainability is being communicated through forest management plans and attempts to determine whether sustainability and sustainable forest management are being successfully operationalized. We interviewed foresters and planners who have been involved in the design, implementation, evaluation, and/or revision of forest management plans. The sample was representative of public and private ownerships. The results of the survey provide information on the most common key terms that foresters and planners associate with sustainability and sustainable forest management and how they are, or are not, included in an actual forest plan document. These findings are then used to inform the next step of this research, which is to perform a future content analysis of publicly available forest management plan documents.

Moving Activity to Productivity - Approaches to Goal Setting, Time-Management, and Rituals to Support Faculty Success

Marshall A. Baker
North Carolina State University, Raleigh, NC

Catherine W. Shoulders
University of Arkansas, Fayetteville, AR

Brian E. Myers
University of Florida, Gainesville, FL

Michael Retallick
Iowa State University, Ames, IA

Balancing expectations and responsibilities associated with personal and professional life is a struggle among faculty members. Finding a time management system can be as paralyzing as the overwhelming to-do list. One year ago, four faculty from four different institutions formed an accountability team to improve individual productivity. The purpose of this presentation is to share the authors' experiences and decision-making process to identify a time management system that is manageable and effective. Three of us adopted the Full Focus Planner (FFP). One of us, after experimenting with the FFP, elected to modify a downloadable template used in a Disc/Arc-based planner. While the planners may differ, the basic time management/energy management principles are the same and resulted in six key planning principles: (a) setting annual goals, (b) using a digital monthly calendar to record important events, (c) creating an ideal work week schedule, (d) daily planning of Big 3 goals, tasks, and task time allotment, (e) daily ritual planning and tracking, and (f) weekly and quarterly review and preview planning. The six steps increased our efficiency and productivity and we suggest others experiment to find a system that works for them. Start simple and scale-up as habits are established. The daily ritual of "planning tomorrow, today" was most profound in meeting our goals. Capitalize on your natural rhythms by scheduling the most challenging activities during your most productive time. We found that by "touching tasks" only once, we could establish flow and complete tasks at a higher level.

Using the Jigsaw Method in a Meat Processing Course

B.S. Walters*
University of Wisconsin, River Falls, WI

Teaching a Meat Processing course can be challenging when trying to create a balance between hands on experience, exposure to multiple types of meat products, operation of processing equipment and classroom management. Traditionally one type of meat product would be made at a pilot plant scale, of about 50 + pounds, during each lab period with a group of 15 students. Only five students would operate the equipment while the rest of the students watched. Students in that scenario are exposed to larger equipment than bench top size but have limited opportunities to operate the equipment. The Jigsaw teaching strategy requires students to work in groups where each student is responsible for providing unique information to the group. Using this strategy each lab period splits the students into groups of three, each of which will produce a different meat product from the same meat product category such as cured fresh sausage. Once the products are made the students are then regrouped into three groups where each member will have been involved in making a different product. The students then discuss their unique product with the group in order to answer the set of provided questions. This teaching method allows the students to sample five to six different meat products each week instead of one. The possibility of potential problems occurring while processing meat products increases allowing the students to see defects firsthand instead of just looking at pictures.

Bisonburger or Hamburger? A STEM Exercise

Latrice Tatsey and Tony Hartshorn
Montana State University, Bozeman, MT

Students rarely think about the origin of ‘burgers or their corresponding environmental consequences. This project highlights one STEM approach to encouraging greater thoughtfulness. For thousands of years, millions of bison (hereafter in-nii, to encourage greater reflection) transformed the Northern Great Plains (NGP) and its soils, including Idaho. For the last century, however, much of the rangeland in the NGP has been dominated by cattle. Recently, however, a number of private ranches and several Indian reservations have begun to reintroduce in-nii to their ancestral range. These reintroductions represent an underappreciated opportunity to engage students with applied STEM approaches. To what extent, for example, can different ungulate signatures in the soil be detected? How might these signatures have been altered over time? And to what extent could local geomorphologic setting (high plateaus, intermediate backslopes, or low floodplains) have influence these signatures? We contrasted chemical, microbiological, and physical soil properties for areas on the Blackfeet Reservation that had experienced recent in-nii grazing only or cattle grazing only. One soil property, soil organic matter, from the uppermost 6 inches (15 cm) averaged ($\pm 1SD$) $3.9 \pm 1.0\%$ in in-nii-grazed pastures, slightly lower than but not significantly different from soil organic matter levels in cattle-grazed pastures ($4.6 \pm 0.6\%$). Analyzing multiple soil depths and using alternative historical management indicators such as respirable carbon and permanganate-extractable carbon can help disentangle the combined soil signatures of in-nii and cattle, improving student engagement and contributing to more holistic food systems thinking.

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Oral

College and Career Advising by Secondary Agricultural Education Teachers: Preparing High School Students for Success

Travis D. Park*, Rachel Berube*, Emma Cannon* and Olivia Watson*
North Carolina State University, Raleigh, NC

While many factors influence a student’s career choice, significant adults such as high school agriculture teachers have a major impact on their choices. By understanding how agriculture teachers’ roles are embedded within students’ contextual influences defined by the Social Cognitive Career Theory, this study aims to better identify how teachers’ collegiate and career advice can operate as opportunity structures to their students. A simple random survey was conducted of all North Carolina high school agriculture teachers. The purpose was to describe how secondary agriculture teachers advise their agricultural education students to prepare for college admission and careers in agriculture. Teachers reported they most frequently conducted a generic assignment about careers ($M = 3.78$, $SD = .60$) and instructed students to research a college and at least one agricultural career ($M = 3.31$, $SD = .92$). Concerning engaging students on assignments and activities related to colleges, teachers reported that there was a low frequency of them visiting a college ($M = 2.47$, $SD = 1.08$), however, there was a higher frequency on assignments about college exploration ($M = 2.87$, $SD = .88$). Teachers reported they did not regularly visit North Carolina State land-grant university ($M = 2.11$, $SD = 1.12$). Agriculture teachers’ encouragement in general agricultural careers was 96.6%. Teachers’ encouragement of students to pursue a career in agricultural education was only 73.0%. Findings can be used by university recruiters and faculty to understand how best to work with agriculture teachers to connect high schools to colleges of agriculture and careers in agriculture.

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Poster

Innovative Practices for Using Case Studies in Undergraduate Extension Education Courses

Joseph L. Donaldson
North Carolina State University, Raleigh, NC

Case studies are useful for engaging students and building problem-solving and critical thinking skills. Well-developed case studies empower students to apply theories to real-life problems and increase discussion between and among students and faculty. In the college curriculum, case studies are important for helping students to think beyond the classroom, solve workplace problems, and prepare career-ready graduates. Case studies have been instrumental in revising three undergraduate Extension Education courses at North Carolina State University: Introduction to Cooperative Extension, Planning and Delivering Nonformal Education, and Advanced Issues in Extension Education. The objectives were to prepare case studies aligned with the Extension Education course objectives and to identify and implement best practices for using case studies for undergraduate students. Innovative practices for creating case studies included: (a) using online, federal court documents pertaining to Cooperative Extension to create case studies; (b) adopting case studies from the nonformal learning literature to Extension organizations; and (c) drawing from the faculty member's professional dilemmas as a former Extension Agent and Extension Specialist. Other useful approaches include the use of free, online software for generating fictitious names. The approaches and learning from the three Extension Education courses may inform other courses in the agricultural and human sciences. Case studies are important instructional tools in diverse disciplines such as agriculture, management, and philosophy, and it is imperative that faculty investigate ways to apply case studies that will empower students' deeper learning, communication skills, and engagement.

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Poster

Facilitating Learning Through Guided Internships

Misti Sharp
University of Florida, Gainesville, FL

In the Spring of 2018, students at the University of Florida had the opportunity to apply to an internship with a private sector consulting firm. The task was to design and distribute a survey and then to analyze and publish the results of the survey to be used by industry and public entities. The key difference for this internship and a "normal" internship is that it was set up as a class that met once a week to discuss goals, strategies and progress. The goals of this class were: 1) increase preparedness for success in business, 2) foster and enable leadership opportunities and learning, 3) improve the relevance of UF undergraduates, 4) strengthen diversity in thought, participation and ongoing interaction, and 5) develop problem solving skills and self-motivation. This presentation will illustrate the design of the class, the learning process of the students (via weekly check-ins), the leadership aspects of the course (self-organization) and the outcomes of the experience (the final product and debriefing) as these aspects relate to the overall goals of the innovative learning experience. Evidence of high order critical thinking skills relative to a traditional data analysis class will be provided. Additionally, the presentation will highlight the use of technology to achieve the goals of the project including the use of Qualtrics, Excel and Basecamp.

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Poster

Perceptions Concerning Distance Learning in Agriculture and Natural Resource Sciences

Omkar Joshi and Thomas Kuzmic
Oklahoma State University, Stillwater, OK

With the technological advancement and increased access to the internet, interest in distance learning has continued to grow since the past two decades. Many land grant U.S. institutions, including agriculture and natural resource programs, offer online courses to meet the students' demand. Despite its growth, there is continuous skepticism concerning quality of online instruction. The main goal of this study is to understand how major educational stakeholders (e.g., instructors, students) view benefits and challenges associated with online instruction and learning. This study utilized a mixed mode data collection method, which involved informal group meetings as well as online survey administration, to determine how major stakeholders of instructional processes perceive distance learning. The requisite data were analyzed using the strengths, weaknesses, opportunities, and threats (SWOT)-Analytic Hierarchical Process (AHP). The results have quantified perceptions on several attributes of online learning including work home balance, lack of social

interactions, virtual classroom opportunities for working professionals, and potential threats associated with academic integrity and internet scams. Study insights are likely to benefit academic administrators, instructors, and students to identify management solutions pertaining to effective distance learning.

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Poster

Incorporation of New Opportunities in Agriculture into High-School Classrooms

A.J. Lindsey

The Ohio State University, Columbus, OH

The integration of technology into the fabric of agricultural production has resulted in many new career opportunities in STEM fields with applications both on-farm as well as in the industry supplying services. However, many of the current techniques and tools may not be well known outside the field of agriculture. Secondary school students may not decide to pursue post-secondary training and careers in agriculture due to limited exposure of how STEM fields are applied during production. The objectives of this research are: 1.) Enable secondary school teachers to learn about the major agricultural systems through hands-on experiences with agricultural research projects, Extension talks, and learn how to analyze the data with accessible tools; and 2.) Empower teachers with educational modules to achieve student learning objectives and enable rapid incorporation into current curriculum. Three sessions occurred during in July 2017 and 2018, with participation from almost 50 teachers. Participants learned about tools like proximal sensors (NDVI, apps) to evaluate crop health, how different planting technology is being used, and how data from drones is helping scouts and farmers. Teachers also participated in data collection and analysis processes and were provided worksheets and files to bring the activities back to the classroom. The greatest changes in teacher knowledge were associated with improved understanding of career opportunities in agriculture as well as the use of NDVI in the field. The author acknowledges the USDA-NIFA Professional Development Opportunities for Secondary School Teachers Program (PD-STEP), Award 2017-68010-25959, for funding these activities.

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Poster

Broadening the Voice of Science: Promoting Scientific Communication in the Undergraduate Classroom

Lauren A. Cirino, Zachary Emberts, Paul N. Joseph, Pablo E. Allen and Christine W. Miller
University of Florida, Gainesville, FL

David Lopatto

Grinnell College, Grinnell, IA

Effective and accurate communication of scientific findings is essential. Unfortunately, scientists are not always well trained in how to best communicate their results with other scientists nor do all appreciate the importance of speaking with the public. Here, we provide an example of how the development of oral communication skills can be integrated with research experiences at the undergraduate level. We describe our experiences developing, running, and evaluating a course for undergraduates that complemented their existing undergraduate research experiences with instruction on the nature of science and intensive training on the development of science communication skills. Students delivered science talks, research monologues, and poster presentations about the scientific research in which they were involved. We evaluated the effectiveness of our approach using the CURE survey and a focus group. As expected, undergraduates reported strong benefits to communication skills and confidence. We provide guidance for college researchers, instructors, and administrators interested in motivating and equipping the next generation of scientists to be excellent science communicators.

Workshops

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Using Virtual Reality to Promote Active Learning in Agricultural Courses

Workshop Coordinators / Presenters:

OP McCubbins
Texas A&M University

Clint Stevenson
North Carolina State University

Students in many agricultural disciplines are heavily impacted by experiential education that connects them with the real-world facilities (farms, fields, processing plants, etc.) and subject matter they are studying. However, facilitating these experiences is a challenge for their instructors for several reasons (e.g. cost, time, spatial proximity, relationship building, etc.). This workshop will share some best practices identified by presenters who have found virtual reality to be a solution to these challenges. In particular, it will build upon previous VR workshops at NACTA that addressed VR by identifying VR applications and showing participants how to design VR experiences that entail activities that lend themselves to learning analytics, adaptive learning, and grading strategies.

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Creating Engaging Learning Opportunities with the Next Generation of Animal Scientists (Or any Scientists)

Workshop Coordinator / Presenter and Co-Presenter:

Celina Phillips and Kate Moore
California State University, Chico

Student demographics are shifting in agriculture science programs across the US. At CSU, Chico, we have observed an increase in students from urban backgrounds, with limited animal experience in our animal science program. This is requiring more remedial instruction to get students the necessary background for basic animal science curriculum. This workshop will focus on developing engaging teaching tools that are not resource heavy, specifically digital “escape rooms” using Google Forms. Presenters will discuss what an “escape room” is, the pedagogical principles involved, and demonstrate an “escape room” from a Feeds and Feeding course for the first part of the workshop. The second part of the workshop will involve assisting attendees with developing their own digital “escape room” for a science-based course. Workshop participants need to bring a device (laptop or tablet) that can access Google Forms and an idea for a lesson or two that they might want to work into an “escape room”. Participants will work in small groups to share ideas and brainstorm and develop their “escape room” with presenter input as needed.

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Improving Social Science Research through Reliability and Validity

Workshop Coordinator / Presenter and Co-Presenters:

Shelly Sitton
Oklahoma State University

Jill Rucker, Donald M. Johnson and Kate Shoulders
University of Arkansas, Fayetteville, AR

As professionals, we work to provide outstanding, credible research. When we engage in social science quantitative research, a critical need exists to conduct reliability and validity tests as data is collected and analyzed to ensure rigorous and trustworthy results. Reliability and validity information should be included in NACTA Journal articles to ensure procedural consistency among authors. Workshop presenters will offer insight about and best practices for measuring reliability and validity as well as share resources to help future authors. The workshop will provide attendees with an avenue to discuss their questions relating to the professional advancement of social science research, which meets a core mission of NACTA.

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Show Me the Money: Fundraising Skills for Agricultural Educators

Workshop Coordinator / Presenter and Co-Presenter:

Annie Muscato and CC Suarez
University of Florida, Gainesville

Fundraising isn't something we commonly think of when we consider the needs of agricultural education students, but it should be. Consistently, agricultural educators indicate that they have a need for more training in the areas of fundraising, advisory board development, and grant-writing. This isn't shocking when you consider the commonality of frozen or decreased public education budgets. As public support dwindles, the immediate need for private support grows. If today's agricultural education students are tomorrow's agricultural educators, this is a gap in knowledge we have a responsibility to be closing now. This workshop will give participants an overview of basic fundraising principals, ways to facilitate an advisory board working for you, and fundamental grant writing skills. Additionally, it will demonstrate how these topics can be taught to agricultural education students in an engaging experiential way.

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Bridging Learning Across Continents: Effectively Leading a Study Abroad Experience

Workshop Coordinator / Presenter and Co-Presenters:

Gaea Hock
Kansas State University

Marshall Baker
North Carolina State University

Jeremy Falk
University of Idaho

Tobin Redwine
Texas A&M University

Dewey (1938) shared that all learning is experiential, but not all experiences lead to learning. Faculty and students invest a great deal of time and resources on study abroad experiences, but how do we best catalyze the rich experience to lead to enduring learning? Bottom line, how you structure, facilitate, travel, reflect, and conclude an international experience. Helping students connect their experiences abroad to course competencies and career skills is a critical element of a high-quality immersion experience. We will examine and discuss research-based best practices when creating, leading, and reflecting on a study abroad experience. During this workshop, four faculty members will share their experience leading groups abroad and provide tangible strategies and examples tied to effective experiential pedagogy. Four critical educator roles will be presented along with practical examples of each. Discussion will include how to best facilitate learning before, during, and after the trip, specifically effective reflection strategies. Additionally, tips on how to help students tell their own story through thoughtful writing and photography skills will be

shared. No matter the size of your group, there are strategies that can be applied to make it a valuable learning experience.

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Using Interpersonal Teams to Bridge the Gap Between STEM and Students

Workshop Coordinator / Presenter and Co-Presenters:

Jeremy Falk, Kasee Smith and Bishal Thapa
University of Idaho

Sometimes, group-work doesn't work. We need to effectively design teams in our courses to develop the smart skills that allow students to communicate, plan, and execute assignments. Join this workshop if you want help in designing projects for students to learn the content of your course while stretching their current people skills. Researchers have recently concluded that one of the best ways to retain abstract concepts, like many of those found in STEM disciplines, is in a learning environment that promotes teamwork and interpersonal relationships. This workshop will bridge the gap between rigorous STEM concepts and the psycho-social connections to help solve grand challenges.

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Drones are Everywhere

Workshop Coordinator / Presenter:

Andreas K. Wesemann
Utah State University

Drones are everywhere! Using technology to enhance learning in collegiate and secondary school education: Unmanned Aerial Systems are invading our campus at Utah State University, and we see drones flying everywhere. Using hands-on activities, including design, building and flying, students are becoming FAA certified Remote Pilot as part of a new minor at USU. This workshop will discover how this program was created, how the use of active learning labs compliments students' programs in all disciplines from journalism to business, and landscape architecture to natural resources. Using examples from the first year of course offerings, participants will discover how this course is the opposite of lecture and uses modern technology to teach across all the STEM disciplines. This workshop will review today's technologically minded students, as digital natives who will Google while you are presenting, and present how student learn best by "hands-on" activities. This generation that thrives on extreme and edutainment, can be enticed to STEM with this rapidly emerging technology. Using the latest technology can enhance many agriculture topics, from animal tracking to crop analysis, and water observation to landscape mapping. Yes indeed, drones are everywhere!

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The Membership and Public Relations Committee: (a) provides recommendations to the Executive Committee regarding membership policies and procedures; (b) conducts membership recruitment activities; and (c) conducts public relation activities. The Membership and Public Relations Committee is composed of the Membership Director who serves as chair and the Regional Directors, Regional Directors-Elect, Secretary/Treasurer, Editor, Association Liaisons, and other NACTA members.

Committee Chair - Tracy Dougher

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Educational Issues and Teaching Improvement Committee

The Educational Issues and Teaching Improvement Committee (a) solicits and responds to member needs regarding programs and activities for instructional improvement; (b) identifies, develops, sponsors, and conducts specific teaching and learning related activities such as blue ribbon presentations, round tables, symposia, and workshops at the annual conferences; and (c) provides recommendations and assistance to the Editor regarding the publishing of materials pertaining to educational issues and teaching improvement.

Committee Chair - Brian Pearson

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Teacher Recognition Committee

The Teacher Recognition Committee: (a) establishes and publishes policies and guidelines for the teaching awards; (b) receives nomination materials; (c) determines the award recipients; and (d) posts the names of award recipients to the NACTA Teaching Awards website within four weeks following the annual conference.

Committee Chair - Wendy Warner, Term 2018-2020

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Journal Award Committee

The Journal Award Committee: (a) establishes policies and guidelines for the journal awards; (b) evaluates articles in the four issues of each volume of the Journal; and (c) determines the award recipients.

Committee Chair - Chad Miller

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Journal Committee/Editorial Board

The Journal Committee (a) provides recommendations and assistance to the Editor regarding Journal policies and content; and (b) reviews manuscripts submitted to the Journal for publication and abstracts for the Annual meetings. The Editor shall chair the committee. Members of the Journal Committee serve as the Editorial Board for the NACTA Journal.

Committee Chair - Rick Parker

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International Committee

The International Committee: (a) disseminates items of interest to NACTA members concerning international agriculture; (b) encourages publication of articles on international agriculture in the NACTA Journal; and (c) serves as liaison between NACTA and other organizations involved in international agriculture.

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The Nominating Committee: (a) selects nominees for President-Elect and open Director-Elect positions; (b) presents this slate to the Executive Committee for approval at the Fall meeting; (c) prepares ballots and distributes information about the candidates to the membership at least 90 days prior to the June conference; and (d) conducts the election via electronic voting. The Nominating Committee is composed of the three most recent past presidents of NACTA and two other members appointed by the President. The Immediate Past President chairs the committee.

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The Undergraduate Experiential Learning Committee: (a) collaborates with the Judging Conference Liaison to intentionally extend the purposes of NACTA through the Judging Conference; (b) explores creative opportunities for NACTA to enhance undergraduate experiential learning; (c) develops stronger career preparation and skill development opportunities through enhanced relationships with agricultural and environmental business leaders and companies; and (d) works with the Educational Issues and Teaching Improvement Committee to recommend programs for the annual conference focused on the implementation and assessment of experiential learning activities.

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Conference abstracts are published as a supplement to the NACTA Journal, the official publication of the North American Colleges and Teachers of Agriculture (NACTA). The NACTA Journal is a professional refereed journal. It is directed toward the scholarship of teaching and learning and the professional advancement of the teachers of agriculture, food and natural resources. The Journal presents papers on all aspects of teaching, including methods, problems, philosophy and rewards. The Journal offers something for every teacher in agriculture or a related discipline. Whether traditional classroom or extension-related, its primary purpose is to strengthen professional competence in collegiate teaching and learning. Instructions for publishing in the Journal can be found on the NACTA website.

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