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Oral Presentations

005

Preparing Graduate Students in Agriculture and Natural Resources to Communicate About Science and Research

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University of Florida, Gainesville, FL

Outreach to the public is one of the most important ways in which significant outcomes and impacts of research can be demonstrated in measurable, quantifiable terms. In addition to developing expertise in their science, researchers increasingly need to be able to convey its significance to policy makers, funders and the general public. In Spring 2018, we offered a new online graduate course focusing on the planning and production of written, digital, and visual instructional and communication materials designed to support outreach programs in the sciences. Graduate students in scientific disciplines were instructed in how to think critically and creatively, with respect to developing outreach programs to engage the public about the importance of science. We also addressed how public engagement and outreach can be used to convey the public value of their own work. Course topics included storytelling, communicating about crises and contentious issues, communicating to news media, video storytelling, social media, civic dialogue, effective posters and presentations, and reporting/evaluation of outreach efforts. Students in the class represented a variety of disciplines, including wildlife ecology, food and resource economics, horticultural sciences, entomology, animal sciences and agronomy. This presentation will provide an overview of the course content and share qualitative research related to the students' experience in the course.

008

Use of Appropriate Humor to Enhance Student Engagement and Learning

Donald M. Johnson*
University of Arkansas, Fayetteville, AR

College teaching at its best is all about developing and nourishing human relationships; few things build this relationship better than shared laughter. Appropriate classroom humor builds rapport, increases interaction and engagement, builds connections and goodwill, reduces anxiety, and makes classes more enjoyable. Most importantly, research indicates that appropriate, non-threatening humor enhances student engagement, learning and retention. Thus, the true objective of using appropriate humor (funny stories, props, humorous analogies, cartoons, self-deprecating humor, and similar strategies) in the classroom is not entertainment but increased student learning. This presentation provides a research-based rationale for the use of humor in the classroom; provides guidance on how to ensure humor is appropriate, not offensive, and truly supports student learning; illustrates specific examples of acceptable, subject-focused classroom humor; and provides a qualitative assessment of student reactions to the use of humor in the classroom.

010

Increasing Scientific Literacy through Inquiry-Based Professional Development

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University of Tennessee, Knoxville, TN

High school students in the United States and in Tennessee lack proficiency in science. Therefore, the Tennessee Coordinating Commission for Postsecondary Education funded a yearlong professional development (PD) program. Twenty-

seven agriculture and science teachers participated in the initial two-day component of the PD designed to improve content knowledge and experience with inquiry-based learning. Teachers completed example scientific units using inquiry-based learning pedagogy within the context of genetics, muscle biology, microbiology, and nutrition. Upon conclusion of this PD exercise, teachers completed a 12-question evaluation that focused on their confidence and presumed ability to implement inquiry-based learning techniques. The instrument used a 4-point Likert type scale ranging from strongly disagree (1) to strongly agree (4). Teachers agreed the PD increased their content knowledge and will allow for course enhancement in genetics (3.22), muscle biology (3.37), microbiology (3.30), and nutrition (3.37). Additionally, teachers indicated they plan to advance the level of inquiry based learning in their classrooms (3.52), use essential features of classroom inquiry and their variations framework to develop inquiry based learning activities (3.37), make inquiry based learning more learner directed (3.44), incorporate experiential learning into learning activities (3.56), and incorporate student's previous knowledge into learning activities (3.63). Overall, teachers were confident they could implement their new knowledge and skill (3.48). Findings indicate these teachers will purposefully integrate inquiry-based learning techniques and discipline specific content knowledge into their classrooms. Completion of the yearlong PD will allow for further investigation of the impact from this PD.

011

Use of In-Class, Group, Question Sets to Improve Self-Direction and Critical Thinking for Students Enrolled in a College of Agriculture

Christina H. Esquivel and Theresa Pesl Murphrey
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For students to be successful in employment across agriculture, they must be self-directed towards exploration and learning and possess critical thinking skills to help them gather and assess

relevant data, come to well-reasoned solutions, and communicate effectively. An instructor can create an environment that encourages self-direction and promotes critical thinking by using in-class, group, question sets. Students enrolled in sections of an introduction to agricultural economics course are assigned problem sets and form groups in class. The groups are provided approximately 20 minutes to complete as much work as they can be using any supporting materials. At the end of the twenty minutes, the instructor randomly selects groups to present their answers to the entire class, showing all steps and providing explanation. The students may use any supporting materials and can ask for help from their group or other groups. The instructor identifies errors and answers questions from the class. The instructor can also use the problem as a basis to expand on content. This process continues until all problems on the set are covered. The innovativeness relates to employing group work in a classroom setting with immediate instructor feedback. The number of students taught using this method has been approximately 1,400 over the past three years. Student responses received from end of course evaluations show increased efficacy in understanding course concepts, increased motivation to work toward learning content, and perceived improved content mastery due to these exercises.

013

Walk the Walk: A Sustainability Program for Agricultural Partnerships

Rebecca A. Kurnick, Shannon K. Arnold*
and Dustin K. Perry
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Attitudes of consumers are changing; they are showing concern for the methods and nature of modern production and thus are making choices that are more ethically sound and personally pleasurable. Furthermore, support of local economies has been identified as a major altruistic motivator for purchasing local foods. A Montana-based restaurant established a flagship program with a local, certified organic market garden to

promote local relationships as a priority for the benefits to the business and community. Primary objectives of the program were (1) to increase staff knowledge of farm partners and production practices, and (2) to develop and increase public awareness of efforts to support local businesses and agriculture. The program began when the restaurant purchased equipment for the partner farm with the arrangement that they would be paid back in an equivalent value of produce. Program activities included Montana farm, ranch and purveyor tours and food and beverage classes. A needs assessment seemingly maximized ownership, effectiveness, and 'creative participation' in the program as a whole. Staff most frequently reported a desire to know more about purveyor's operational procedures. Staff were encouraged to share local food and food production practice knowledge with guests. When asked how comfortable staff were with this, 48% (N=25) reported a confidence level of 80% or above. The program continues to serve as a resource for reaching out to new audiences as a form of capacity building. Future outputs include info-graphics and interactive promotional materials to educate restaurant guests and staff.

015

International Graduate Students' Perception of Socio-Communicative, Teaching, and Learning Style

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University of Florida, Gainesville, FL

As the number of international graduate students in the United States continues to increase, the number of students that are multilingual increases as well. As diversity is encouraged in higher institutions, it is important for faculty members to have an understanding of the influence of cultural differences on the academic lives of international students. In order to understand the views of international graduate students on how well they adapt to their new learning environment,

this qualitative study sought to explore and describe the perception of international graduate students of the socio-communicative style (SCS), teaching, and learning styles of instructors. Interviews were used to investigate the perceptions of international graduate students of the difficulties they experienced at the onset of their learning. The data collection process also gave an opportunity to compare their perceptions of the teaching, learning, and communicative cultures in the U.S. and universities in their home countries. A convenience sample of 13 participants were interviewed to describe their perceptions and thoughts. The findings from this study showed the admittance of participants about the stress of adapting to a new learning environment and the type of difficulty they go through in the process. It further elucidated their views of the SCS of faculty members, teaching styles of faculty members, and their self-perception of learning styles.

016

Preliminary Investigations into Agricultural Teachers' Views of Sustainable Practices

Craig Kohn*
Michigan State University, East Lansing, MI

Many existing agricultural practices result in harm to ecosystem services on which agriculture depends and are not consistent with the long-term needs of the industry. Due to its positive associations with student identity, secondary agricultural education could potentially play a larger role in increasing the adoption of sustainable knowledge and practice among future agriculturalists. To accomplish this, agricultural instructors would need to possess knowledgeable and positive views of more sustainable production methods. As part of a pilot study intended to guide design-based research for developing sustainability curriculum and instruction, eleven licensed instructors and five undergraduate student teachers were interviewed to determine their attitudes and knowledge of agricultural sustainability and community-based instruction. These interviews were transcribed, coded, and assessed for inter-rater

reliability. The resulting conclusions were confirmed with participants and were also triangulated with a 10-question non-scientific agricultural sustainability survey which received responses from 58 agricultural instructors from a politically-balanced Midwestern state during a 3-day period in response to an email listserv request. Results suggest that while ag instructors are generally supportive of farmers and the use of genetically modified organisms, most have concerns about the long-term sustainability of current agricultural practices (particularly in regard to their impact on soil and water quality). Furthermore, most view climate change as a human-caused threat to agriculture. These findings will guide the collaborative development of an agricultural sustainability curriculum that will be fully aligned to the national AFNR Academic Standards, the Three Circle Model of Agricultural Education, and the Next Generation Science Standards.

017

**Collaborative Flipped Classrooms:
A Transformative Approach to Teaching
Technical Writing**

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Shannon R. Wiley
Virginia Tech, Blacksburg, VA

Given the increasing evidence that information technology is transforming much of society, it is believed that it will be the defining transformative innovation for higher education. As educators seek ways to differentiate instruction to fully maximize learning and transfer knowledge to real life application, one definitive approach is utilizing collaborative flipped classrooms to develop both technical and interpersonal skills that will be useful in academic and professional environments. Collaborative flipped classrooms allow students to learn content at their own pace and apply this new knowledge with support from the instructor and their peers. This study explored students' perceptions of a collaborative flipped undergraduate technical writing course for agriculture and

natural resource majors in an effort to glean insights on how this instructional approach impacts student engagement and thus the ability to accomplish the learning objectives. Guided by the theory of planned behavior, undergraduates enrolled in the writing course (n=46) were broken into small groups to participate in an hour-long focus group regarding their attitudes, subjective norms, and perceived behavioral controls related to the course. Major findings related to the aforementioned constructs were gleaned from the focus groups. They were: 1) Participants were primarily satisfied and comfortable participating in this new instructional approach; 2) Proper facilitation of collaborative blended learning enhances learning opportunities, satisfaction and student achievement; and 3) Several perceived behavioral controls were identified, particularly instructor engagement and support. Recommendations include replication of the study and implementation of best practices to improve the quality of virtual instruction.

019

**Impact of Teacher Attire on Students'
Views of Teacher Credibility and
Homophily**

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A multiple case study design was used to examine the impact of various forms of agriculture teacher attire on students' perceptions of attitude homophily (perceived similarity between oneself and another), background homophily, and teacher credibility. Fourteen agriculture classes across four high schools were randomly assigned to receive a guest lecture taught by an instructor unknown to the students dressed in one of three validated treatments: business professional attire, business casual attire, and casual attire. Following the guest lecture, students completed a survey that measured their perceptions of the instructor's attitude homophily, background homophily, and credibility. Findings indicated differing perceptions of business professionally, business casually, and casually dressed agriculture

teachers between schools. Business professional attire yielded the highest credibility scores in School A; however, these students viewed the instructor as most homopholous with them when wearing business casual attire. School B students indicated higher perceptions of homophily and credibility when the instructor wore casual attire to teach Agricultural Mechanics, but those perceptions were reversed when the guest instructor taught a lesson on Food Science. School C students perceived the instructor as more homopholous and credible when wearing business casual attire. School D students reported highest perceptions of attitude homophily and credibility when wearing business professional attire, but of background homophily when the instructor wore casual attire. We recommend teachers wear business casual clothing most frequently to moderate between students' teacher-related and agriculturalist-related expectations, while shaping students' views regarding the professionalism of the agricultural, food, and natural resources industry.

023

Preparing a University Agriscience Teaching Methods Class to Design, Deliver, and Assess a Preservice Climate Science Teaching Activity

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The objective of this project was to prepare upper division university students for teaching secondary agriscience, where a significant portion of the course is dedicated to designing, delivering, and assessing a preservice teaching activity at a university administered youth agricultural science center with an underserved Hispanic population in Northern New Mexico. Fourteen university students designed two climate science lessons: understanding the difference between weather and climate (WC) and accessing and analyzing web-based weather and climate data (AA). Lesson development and summative assessment was guided by a science comprehension model incorporating inquiry-based and experiential learning

activities to teach three components of science comprehension: science knowledge, science skills, and reasoning abilities. Teams of seven students taught five lessons during the day to youth in either middle school life science (n=99) or physical science (n=85) classes. Multiple choice post-tests were administered to youth the following week. For life science students (WC), knowledge scores averaged 86.36%, skill scores averaged 75.25%, reasoning scores averaged 83.83% and overall science comprehension averaged 81.82%. For physical science students (AA), knowledge scores averaged 81.18%, skill scores averaged 72.35%, reasoning scores averaged 82.35% and overall science comprehension averaged 78.63%. Common themes from University student evaluations included: the importance of classroom management, making in-class adjustments to content and content delivery, and identifying improvements to their own teaching approaches. The results suggest the need to modify lesson content, expand both lessons to cover additional class periods, and improve evaluation rubrics to standardize quality of formative and summative assessment.

029

Skill and Attribute Demands of Agricultural Employers: A Best-Worst Scaling Approach

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Today's college graduates turned job candidates continue to face an increasingly competitive employment search process. Employers are searching for well-rounded job candidates who possess not only subject matter knowledge and technical skills, but also 'soft' skills (e.g.—oral/written communication, working with others, being innovative/creative). According to a recent study by the World Economic Forum, by 2020 soft skills will be in greater demand than technical skills. To better understand what soft skills are preferred in new hires, a survey was administered to agricultural employers attending the 2017 Agricultural Career

Fair at Illinois State University. The primary objective of this study was to determine the skill(s) these industry professionals found to be most important in new hires. A stated choice method, “Best-Worst Scaling (BWS)”, was used to elicit participant preferences towards the importance of six skills in new hires. This choice-based method has significant advantages over other survey formats (e.g., ratings scales). It allows for an individual’s strength of preference for multiple objects to be calculated over a defined measurement range, providing similar information as a logistic regression model. For example, results from completed surveys (n=71) indicate that respondents found ‘oral/written communication’ to be the most important skill sought in new hires, approximately twice as important as ‘being innovative and creative’. With these results, instructors may choose to tailor existing course activities or create new opportunities to enhance student abilities in these areas and better prepare students for employment in the highly competitive agricultural industry.

030

Motivations to Teach and Plans to Continue Teaching for High School Agriculture Teachers in Iowa

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The purpose of this study was to describe high school agriculture teachers’ motivations (intrinsic, extrinsic, and altruistic) to teach, and to predict how long teachers plan to continue teaching. The online validated questionnaire was sent to teachers in Iowa (N=252) via Qualtrics. Completed questionnaires were received from 119 participants. A four-point Likert-type scale with response options ranging from 1=strongly disagree to 4=strongly agree was used to measure motivation factors. Means and standard deviations were 3.26 (0.32) for intrinsic factors and 3.18 (0.36) for altruistic factors. Overall, intrinsic and altruistic factors motivated teachers’ decisions to teach. The mean and standard deviation for extrinsic factors was 2.54 (0.32) indicating no impact on

teachers’ decision to teach. Intrinsic motivation, extrinsic motivation, altruistic motivation, age and gender were entered into a multinomial logistic regression analysis to predict plans to continue teaching. The result was statistically significant ($\chi^2=12.85$; $p<0.05$) with age being the only significant predictor ($p<0.001$). Further analysis showed that a substantial number of early career teachers were planning to leave teaching in one to five years. Older teachers were more likely to indicate a desire to continue teaching long enough to reach a normal retirement age. Findings from this study are consistent with previous research that reported a considerable number of teachers planning to quit teaching after five or fewer years of experience.

031

Integrating Experiential Learning into Agribusiness Entrepreneurship Education

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Startups’ share of all U.S. companies has declined over the past few decades, falling from over 16% in the 1970s to just 8% in 2014. The high failure rate of startups (49% survival rate in 5 years) may have discouraged people from starting new companies. It is increasingly difficult for small agribusiness startups to survive, as large agribusiness firms get bigger via mergers and acquisitions to gain economies of scale. Consequently, it is imperative to improve current agribusiness entrepreneurship education, helping increase startups’ chances of success. Studies indicate that successful entrepreneurs rely on a solid business plan. To enhance students’ understanding and delivery of a quality business plan, experiential learning was integrated into a recently developed agribusiness entrepreneurship course. Student feedback was an important driver of this modification. Each student startup team was paired with a local small agribusiness in a field related to their project. Tremendous startup opportunities were identified in the food service

and drinking establishment industries. Students were given the opportunity to learn business operations, management, and marketing through onsite observations and interactions with business owners and managers. BizMiner® industry reports supplemented student field experiences. Student-developed field research reports made it easier for them to complete their business plans. The summative score on Excellent Course and Excellent Teacher generated from IDEA student evaluations rose by 13% compared to the semester without the field experiences. Qualitative feedback showed that many students appreciated the opportunity to apply their knowledge outside the classroom for the first time in college.

034

A Summary of Agricultural Mechanical Competencies after High School Matriculation

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Agricultural mechanics in secondary agricultural education programs continues to be an important topic related to adequate skill training. Due to its popularity, agricultural mechanical programs must continuously seek ways to ensure program effectiveness. This study examined the effect of secondary agricultural mechanical courses on teacher agricultural mechanical competence after their high school matriculation. Specifically, the study intended to answer the question: what were the agricultural mechanical competencies of participants before and after their high school agricultural mechanics training? The target population was secondary agricultural education teachers in Northeast Texas during the 2015-2016 school year (N=700) and 150 were randomly selected (n=150). The questionnaire focused on assessing 10 agricultural mechanical competencies based on a 4-point Likert scale: 1.00 -1.50 = no skills, 1.51-2.50 = minimal skills, 2.51-3.50 = basic skills, and 3.51- 4.00 = advanced skills. Entering high school, respondents showed minimal skills (M=2.24, SD= 0.86) in four competencies (concrete, electrical, hydraulics, small engines)

and basic skills (M=2.74, SD=0.83) in the remaining six (structures, cold metal, metal fabrication, plumbing, welding, woodworking). After high school matriculation, respondents showed basic skills (M=3.06, SD=0.82) in nine competencies (structures, cold metal, concrete, electrical, metal fabrication, plumbing, small engines, welding, woodworking), and minimal skills (M=2.27, SD=0.96) in one competency (hydraulics). Based on the findings, teacher preparation programs and secondary agricultural mechanics programs should revisit their curriculums and ensure that content and competencies are affiliated. Finally, post-secondary instructors should encourage student enrollment in agricultural mechanical courses.

035

Using Student Affective Motivation as an Assessment of Dairy E-Learning Modules

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Innovation in teaching approaches is increasingly emphasized in education to make learning relevant to students. One of the ways to make learning relevant to students is by using technology and educational theory, such as Keller's ARCS Theory of Motivational Design, and then gain feedback from students about the learning experience. This research discusses the implementation and evaluation of a unit of self-directed learning e-modules which aim to teach high-school students in a formal classroom setting about the Indiana dairy industry from the cow to the cup through the use of multimedia such as: industry videos, knowledge-check quizzes, graphics, and animated pedagogical agents. The evaluation included a 35-question survey which garnered feedback about the self-directed learning (SDL) experience and pre- and post-knowledge tests. Students demonstrated a significant amount of content knowledge gain; however, the students demonstrated low affective motivation on the instrument. Educators implementing self-directed

curriculum should be confident in the ability of SDL experiences to increase content knowledge and afford students more SDL experiences to increase familiarity with this method of learning in the classroom.

036

How Learning Outcomes, Perception and Assessment Compare

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Student learning outcomes for courses are often constructed by the instructor to indicate what the student is expected to learn by the successful completion of said courses. Students have self-reportedly shown their perceived ability to meet all student-learning outcomes from the beginning of a course compared to the end of a course. Assessment methods in the form of assignments and exams provide feedback to the student and instructor as to whether those student learning outcomes are being met. However, it is often difficult to link an entire assignment or exam to a single learning outcome, or even confidently relate an exam to multiple learning outcomes. To evaluate the efficacy of students' perception in achieving the learning outcomes of a course, students (n=683) enrolled in an introduction to animal science course were given the option to complete a survey. Students were evaluated through pre- and post-course assessments to determine what their perceived level of achievement of student learning outcomes was, based on a scale where 1=not at all and 10=expert level. Each of the 9 statements were linked to one of three student learning outcomes, based on acquisition of knowledge, comprehension and application. Questions on each exam that were given during the semester were linked to a specific learning outcome for the course and the success rates of answering the questions correct were calculated. Results indicate that students significantly increased ($P<0.05$) their perceived ability to meet all student learning outcomes from the beginning of the course compared to the end of the course. Student perception of meeting a learn outcome

was highly correlated to the success rate of answering questions correctly related to that learning outcome.

037

An Innovative Project-Based Learning Approach to Engage Undergraduate Students in Research

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Quantitative methods, or a similar statistics course, is required for undergraduate agribusiness majors in most US universities. Although some teachers incorporate small, simplified (hypothetical) datasets to provide experiential learning, real data can capture students' imagination, increase engagement, and stimulate creativity in pursuit of meaningful results. Additionally, understanding and managing the complexity of real data is important for student learning. To achieve this student learning outcome, the course instructor collaborated with faculty members across various agricultural-related disciplinary areas to access real research data. Student teams used the statistical tools learned in the course to analyze these datasets, culminating in the development of research posters. The final course exam was a poster presentation session attended by departmental faculty members and graduate students. Subsequently, undergraduate students were provided the opportunity to take their research posters to university, regional, and national research events. Participating faculty have leveraged preliminary student efforts, further refining the research for presentation at professional conferences, where on multiple occasions, faculty and students have co-authored award-winning research presentations. This allows students to be published authors before completion of their undergraduate degree. This can help them advance career initiation or enhance opportunities for graduate education. Using a project-based learning approach allowed students to become more comfortable with data management, achieving a stated student learning outcome. Quantitative

(10.5% increase in excellent course item, $p < 0.05$) and qualitative student course evaluations (IDEA) improved after incorporation of real datasets, and development and presentation of research posters in this project-based learning course.

039

Risk Tolerance and Cheap Talk in the College Classroom

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The objectives of this study were to identify characteristics that affect students' reported levels of risk tolerance and to measure the effect of "cheap talk" (simple, non-binding, non-verifiable messages) on classroom communication. In Fall 2017, questionnaires ($n=70$) were administered in a senior-level farm management class at Illinois State University, addressing students' perceptions of their individual risk tolerance. On a scale ranging from 1 ("Don't like to take risks") to 7 ("Fully prepared to take risks"), males reported higher risk tolerance than females ($p < 0.01$). Risk tolerance increased numerically in farm vs. non-farm students (4.82 vs. 4.36) and transfer students vs. native students (4.67 vs. 4.50). Half of the students were randomly selected to receive questionnaires that included cheap talk statements, which informed them that people tend to say they are willing to take more risk than what they actually take in real-life situations. Risk tolerance decreased numerically in those receiving cheap talk statements (4.38 vs. 4.84), indicating that those simple messages may affect perception. Instructors may bring cheap talk into the classroom with offhand remarks (examples include "This will be really quick," or "This is no big deal"). These results suggest that casual phrases matter in effective classroom communication, implying that those cheap talk remarks may influence the importance students place on classroom activities. By identifying characteristics that affect students' tolerance for risk, the results of this study may inform efforts to encourage students as they navigate the challenging and unfamiliar

college environment and take risks in their learning.

040

Developing and Teaching an Exploring STEM in Agriculture Course

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The College of Southern Idaho changed their approach to general education classes creating a new category of GNED 101 classes. These classes are 3-credits, on any topic and taught by any department. One GNED 101 class is required to graduate. A GNED 101 class allows the instructor lots of creativity if these criteria are covered: think, communicate, appreciate, connect and be well. The objective was to create and deliver a project-based GNED 101 class for the fall of 2017 that taught "Exploring STEM in Modern Agriculture." Twenty students enrolled in the course. Through field trips, reflections, development of an infographic and a lesson, students were to learn how STEM concepts are involved in agriculture. Cooperating with local businesses, field trips included: an equipment dealer, where students drove a tractor with modern technology; potato harvesting and storage; 3500-head dairy, irrigation equipment sales, sugar factory, an ethanol plant, and a food processing manufacturer. Students took photos and wrote a reflection on the visit. They wrote short essays on "an educated person," and "ways of knowing." Students presented infographics on STEM in agriculture and a lesson on a STEM component in modern agriculture to the class. Posting of all class work created a website (Ag Is STEM) on Google Sites. At the end of the semester students took an anonymous survey to gauge the value of the class to them. The class taught students to recognize and to communicate the value of STEM and provided improvements for the next time the class is taught.

041

Creating Collaborative Partnerships between Industry and Universities to Solve Complex Agricultural Problems

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The agricultural industry is facing public scrutiny that impacts its ability to meet today's global challenges, including food security and environmental sustainability. Fueled by the rise of social media and an overall lack of knowledge about modern agriculture, consumers are inundated with emotionally-charged pseudoscience that sways their perceptions and actions regarding technological agricultural advancements. The objective of this project was to pilot a collaborative "think tank" between industry and university faculty to create a multi-dimensional, interdisciplinary venture designed to combat pseudoscience regarding agriculture. Industry partners hosted an initial two-day meeting bringing together six experts in agricultural education and extension. The result of that meeting was a second two-day meeting that brought together 35 individuals representing K-12 agriculture teachers, curriculum developers, Agriculture in the Classroom experts, extension agents, science teachers and professors, and university faculty in agricultural education, science, and technical agriculture disciplines. Outcomes of the larger meeting included a repository of resources promoting factual resources about

modern agriculture and a Facebook group dedicated to connecting opinion leaders and experts within the aforementioned disciplines in order to allow for continued collaboration and sharing of ideas and content. The online group also serves to allow members to document outcomes as a result of the meeting, as each member was charged with bringing the mission of the group back to their own sphere of influence. This NACTA submission serves as one of these resulting outcomes, with the goal to identify additional faculty interested in joining in the continued conversation.

043

Teachers' Perceptions of UAVs in School-Based Agricultural Education

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Unmanned Aerial Vehicles (UAVs/drones) have seen a transition from initial military uses to various commercial applications. Recently, system developers have proposed a wide range of government, scientific, and commercial applications including border and port security, homeland surveillance, scientific data collection, cross-country transport, and telecommunication services. In agriculture, UAVs have been used for field trials, biomass research, crop growth monitoring, food quality evaluation, precision farming, and in the monitoring of cereals and maize for harvest and logistic optimization. The primary purpose of this study was to determine the perceptions of Iowa secondary agriculture teachers regarding the teaching of UAV technology in the curriculum and their willingness to participate in future professional development training. Founded in Bandura's Self-Efficacy Theory, we also sought to determine teachers' perceived capacity to teach UAV-related curriculum. Using a reliable, validated, and pilot tested electronic survey instrument, thirteen of fourteen UAV-related curricular components were perceived Very Important for integration in SBAE programs as indicated by mode. Teachers (n=117, 51% response rate) further identified having No to Some Capacity for

teaching twelve of the fourteen curricular criteria. Borich's weighted mean discrepancy scores were calculated to prioritize respondents' professional development needs regarding the UAV-related curricular criteria. We conclude Iowa secondary agricultural education teachers are in urgent need of training opportunities. Future training should be aligned with best practices founded in Bandura's Self-Efficacy Theory, specifically in providing mastery experiences to increase personal self-efficacy. A national study of SBAE teachers and additional research with teachers from other STEM areas is warranted.

044

Self-Monitoring of Academic Writing: A Case Study

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Publications are an important metric for tenure and promotion. It is widely promoted that daily writing of 15 to 30 min per day leads to prolific academic writing. The aim of this case study was to explore the relationship between self-monitoring of academic writing and publication record. A faculty member in a college of agricultural and life sciences with a 3-way appointment (teaching, extension and research) logged minutes of writing for 5 y (2013-2017) with a goal of 30 min/d. Daily writing averaged 34 ± 45 min/d (median: 15 min/d; range: 0-300 min/d). On average, 19 min/d was spent on writing related to Extension, 13 min/d on research writing, and < 2 min/d on the scholarship of teaching and learning. Total writing resulted in 55 refereed and peer-reviewed Extension publications (35 Extension, 18 research, and 2 teaching). Daily writing was quadratically correlated ($R^2=0.72$) to the number of publications in the same calendar year irrespective of lag time from submission. The relationship between writing in min/d and number of publications per year suggests that in this case, productivity leveled off when daily writing exceeded a yearly average of 30-35 min/d. Although various work habits may result in prolific writing, self-monitoring of a writing habit may be a key factor to writing productivity.

Controlled studies exploring the efficacy of self-monitoring of writing on academic productivity are needed and number of publications may be an appropriate outcome of interest.

045

Curriculum Design to Grow Intercultural Competencies as Learning Outcomes

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As agricultural educators develop courses for students to grow and learn, many now recognize that there is a demand for affective, as well as cognitive learning outcomes. Crawford (2011) and Seemiller (2014) identified the ability to work in multicultural and intercultural teams as an expected employability skill, currently a limitation of many agricultural graduates. Natural scientists and educators are trained to teach and assess agricultural science content; however, because of university core embedded outcomes, we now find that universities expect us to include social science competencies to engage students in deeper learning in the affective domain. It is the objective of this presentation to increase the participants' comfort in curriculum design that addresses the inter- and multi-cultural affective domains. We will review the theories and best practices of curriculum design, including differentiated instruction and mapping learning activities and learning outcomes to demonstrate the importance of connecting learning objectives to interventions and then to the assessment of outcomes. When coupled with an understanding of the literature in intercultural competencies; cultural differences (Hofstede), Intercultural Development Model (Bennett), phases of diversity and intercultural effectiveness (Vande Berg, Paige), the task is not overwhelming. We will share examples of course syllabi with mapped learning objectives, specific interventions, and appropriate assessment methods and instruments in a variety of course types. If intentionally researched, planned, and implemented, instructors of agriculture, food and

natural resource disciplines can successfully incorporate intercultural effectiveness outcomes in their courses.

046

Shock Value: Media's Momentary Influence on Perceptions of Animal Agricultural Issues

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Media's influence on public opinion regarding animal agricultural is a concern for the industry. A contemporary animal agricultural issues class at Sam Houston State University challenged graduate students to develop opinions on various ethical, environmental, food, and human health issues. Twenty-one students completed pre-surveys (PRE) to establish baseline values. After PRE, the class viewed four polarizing documentaries and engaged in class discussion. After each documentary, the students completed a post-survey (POST) re-evaluating their opinions. One year later, the students were surveyed again (FINAL) to see how their perspective had changed compared to their original viewpoints. Students' responses were recorded individually and analyzed using the GLM procedure in SAS with students as independent blocks. Students were more likely to express greater concern ($P < 0.05$) for animal agriculture's effect on both species extinction and the environment in POST when compared to PRE and FINAL. This shows there was a return to the viewpoints observed in PRE and one year later in FINAL, indicating the effect of the documentary was only temporary. In POST, students were also more likely to agree that consuming less ($P < 0.05$) animal products ensures environmental health compared to PRE, with FINAL not being different from POST or PRE. The same trend occurred for concerns with the earth's water supplies, demonstrating the initial shock that changed their fundamental perceptions in the moment, failed to have a lasting impact one year later. This temporary change re-

veals that these types of documentaries can influence educated individuals, though, the influence is short-lived.

048

Teaching Deserves Recognition Too! Documenting and Gaining Recognition for Teaching Effectiveness

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For faculty with heavy teaching appointments, it may seem that there is an enormous investment of time and effort, with little opportunity for recognition. NACTA understands the importance of quality instruction and has an awards structure that provides for recognition of outstanding teachers at a variety of levels – from graduate students to veteran teachers. This session, facilitated by a former and the current chair of the NACTA Teacher Recognition Committee, will provide an explanation of the various awards available and offer suggestions for documenting and evaluating components of teaching award applications. Specifically, elements of teaching award packets which have historically been challenging for NACTA members (e.g., self-evaluation of teaching) will be highlighted and methods for creatively evaluating and documenting one's teaching will be demonstrated. This session will be most appropriate for individuals interested in the Graduate Student Teaching Award, the NACTA Educator Award, or for faculty who would like to encourage and mentor graduate students or early-career faculty in completion of an awards packet. These tips will also be useful for junior faculty preparing their dossiers for promotion and tenure.

052

Preparing Interculturally Competent Agriculture Students

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As the United States increasingly diversifies in its cultural composition and the agricultural industry becomes progressively global, the need for an interculturally competent agricultural workforce continues to be present. This presentation tells the story about the evolution of a social justice course entitled: *Communicating Across Cultures*, developed for students within the College of Agriculture at Purdue University. There will be a discussion of the need for and process of developing the course, the challenges that arose, and lessons learned. The course encompasses a wide variety of multicultural topics that include but are not limited to the following: race, socioeconomic stratification, classism, ableism, weightism, ageism, religion, immigration and sexual orientation. The structure includes two 50-minute lectures and a weekly two-hour lab component. Even though the class is centered upon the lecture, it is the lab section that is considered the breadth and the depth of the course. During the lab sections, students are encouraged to freely think and speak with an open mindset. Mirroring the topics discussed in class, the lab includes group activities, individual activities and utilization of up-to-date media outlets such as Blackboard and YouTube. With an emphasis on cross cultural understandings, one of the course's semester long learning activities is the Culture Immersion Project (CIP) where students participate in service-learning with various multicultural communities through a field investigation.

053

Social Media and Faculty Development

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Fourteen faculty from universities across the southeastern U.S. traveled to Belize for an international professional development experience. Prior to traveling, these faculty completed a 10-week program of online modules to develop their knowledge of explicit critical thinking instructional strategies, instructional design and scenario development, and climate change's impact on global food security and hunger. The purpose of this study was to examine how faculty employed social media to share their experiences in Belize with their social networks. After securing IRB approval, social media posts were collected in relation to the international experience. Individual faculty and their representative department accounts were monitored for these posts. Content was also discovered through the search of the program hashtag: #BelizeGTA. The collection of content resulted in 22 Facebook posts, 31 Instagram posts, 69 Instagram Stories, and 32 tweets. All content was archived for further analysis. The researchers then conducted a thematic analysis of the posted content. Interviews were conducted with participants during the experience, with a small portion of the interview being directed towards their use of social media during the experience. When preparing for international experiences, it may be helpful to provide training for faculty on how to tell their story using social media while in-country. This may alleviate some of the anxiety of managing social media while on the

trip. Similar training could be provided for students before study abroad experiences. Future research should examine faculty use of social media prior to, during and post-trip to understand differences.

054

Steer-A-Year: Exposure to the Beef Industry through a Hands-On Learning Experience

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Steer-A-Year is a student club and hands-on, for-credit program in which students manage and care for cattle during the school year at a university facility. The slogan of the program has become "From the sorting gate to the dinner plate". Cattle used in the program are donated from across the Pacific Northwest and arrive in November. Students are responsible for the daily care and management of cattle until reaching market condition. Cattle are then harvested at the university meat lab. At the meat lab, students are exposed to the beef fabrication process and are involved in learning to identify meat cuts and the meat grading procedures. Management of the cattle includes procuring feed bids and ration formulation, monitoring daily feed intakes and health, monthly cattle evaluation/performance data collection, and informing cattle donors and stakeholders of cattle and program events. Along with cattle management and processing, the Steer-A-Year program also provides training in the soft skills that have become highly desired in agricultural fields across the vast industry of agriculture. As students advance in their academic career, they are given the opportunity to apply and formally interview for officer positions within the club, ranging from program manager to public relations, which further develop leadership skills. All students involved have opportunities to attend educational and networking events such as Oregon Cattleman's Convention, National Cattleman's Beef Association Convention, along with industry tours focused on all aspects of the beef cattle industry. Participants develop personally

and professionally in preparation for life after college.

056

Growing the Livestock Adventure for Youth: A Replacement Beef Heifer Development Contest

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Livestock-associated projects and contests have long been a staple youth development strategy for 4-H and FFA. Various animal species have provided experiential learning for hundreds of thousands of young people, who develop a wide variety of skills and competencies. One unique livestock program will complete its tenth year in 2018; the Mississippi 4-H/FFA replacement beef heifer development contest. Commonly, livestock projects consist of selecting, feeding, fitting, and exhibiting a project animal over the course of a single show season. The replacement beef heifer development contest, however, requires consideration of long-term health, development, and productivity of heifers that will contribute to the herd for many years. On November 1, participants submit records of three replacement heifers, along with production-oriented goals for the project. These goals guide participants' management decisions and actions throughout the contest. Over 10 months, contestants consult various beef cattle experts to make educated management decisions about their heifers, maintaining detailed records in a format of their choice. Youths interact with Extension agents and specialists, veterinarians, nutritionists, and other beef industry professionals. At completion, projects are evaluated on three components. Twenty percent of participants' scores are awarded for visual evaluation of the heifers, 30% is awarded for management records, and 50% is earned through an interview and oral presentation. To date, over 50 4-H and FFA members have competed, some multiple times. Preliminary evaluation indicates youth participants not only accumulate practical

experience, they develop an integrated professional network that supports continued acquisition of life skills and beef industry knowledge.

057

Using Data to Improve Academic Programs and Student Success

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A major emphasis continues to be placed on assessment at college campuses across the country. Universities are seeking to develop a culture of assessment across the curriculum to ensure programs are providing the tools to help students succeed in their professions as well as maintaining accreditation status. Assessment has long been part of the accreditation model, but it can also be a powerful tool to help faculty improve the effectiveness of their programs and increase student success. The University of Tennessee at Martin has started tracking student data on several key aspects of its veterinary technician program to measure the likelihood of student success on passing the Veterinary Technician National Exam (VTNE). Faculty began with determining which factors were most likely to impact student success rate on a national licensing examination. The process required assessing new students to the program through an intensive survey questionnaire to determine the initial baseline preparation for the program. Data was then collected on course performance, laboratory experiences, internship performance, and progression through an online VTNE preparatory course. Results indicated key factors such as internship choice, VTNE preparatory results, and science specific courses were significant in impacting the student pass rates on the national exam upon graduation. Faculty have used these findings to improve the student experience. For instance, the timing of course offerings in the student progression to graduation can impact student success. In addition, the results allow faculty to share data with new students in the program on effective strategies for success.

058

One Year Later: Lessons Learned from a Year in West Africa

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The Ghanaian Ministry of Education has recently called for schools to develop more experiential, student-centered curriculum and teaching practices. In response, Ghana 4-H forged a partnership with AgriCorps, a U.S. Non-Governmental Organization. This partnership places agricultural professionals in West African communities, specifically Ghana and Liberia, to teach, build 4-H programs, and work with local farmers. Efforts to evaluate the partnership have resulted in several research studies. This qualitative study explored the personal growth and professional challenges AgriCorps fellows encountered during their year in Ghana or Liberia. Areas of growth were focused on increased cultural understandings and the value placed on relationships. Participants also developed compassion, patience, and personal fortitude, along with stronger communication and teaching skills. Participants' awareness of cultural differences proved professionally challenging at times. Further, participants indicated understanding the culture within the schools and communities as difficult, often attributing them as barriers to the education process. Participants also identified combinations of various factors leading to professional challenges and found it hard to point to specific areas that were the most challenging. Interesting to note, each participant placed themselves in the role of problem-solver and identified ways they had to adapt in order to redirect or intensify the educational plan, rather than giving in to the challenges. Perhaps this problem-solving mentality was an area of personal growth participants failed to identify. Future training should leverage the personal growth areas to create solutions for the professional barriers that exist in this type of experience.

060

From the Classroom to the Cocoa Farm: Preparing Recent Graduates for a Year in West Africa

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AgriCorps, a Non-Governmental Organization strives to increase food security by connecting American agriculture graduates to the demand for experiential, school-based agricultural education in developing countries. AgriCorps connects fellows to small communities in Ghana and Liberia where they serve as agricultural educator, 4-H advisor, and agricultural extension agent. While most fellows have ample experience in production agriculture, 4-H, or FFA, few have experience, education, or training in teaching methods. These circumstances propelled the need for strategic professional development in the areas of teaching and learning. Thus, AgriCorps staff developed a 10-day intensive program to equip fellows with the essential theories, concepts, and strategies needed for teaching in a West African context. Topics included: the philosophy of an integrated agricultural education program, experiential learning, strategies for engaging students, lesson planning and delivery, and classroom management. To measure the effectiveness of this professional development, participants were asked to rate each workshop on its usefulness at two points in time, immediately following the training and again upon completion of their eleven-month service. Fellows identified nine of the 13 workshops to be “useful” or “very useful.” Specifically, they identified the workshops that provided practical application to teaching to be the most useful. As AgriCorps seeks to recruit qualified applicants for future cohorts, it is important to provide effective professional development to maximize their effectiveness as agricultural educators. The objective of this presentation is to open a dialogue about strategies for preparing volunteers with little or no teaching experience in a short-course format.

061

Growing Future Agriscientists: Investigating Barriers to Research Projects

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There is a need for a STEM enabled workforce to meet the demands of the agriculture industry. A method of teaching students to think like a scientist and a way to add scientific rigor in an agricultural science classroom is through scientific inquiry, especially with a research project. The FFA Agriscience Fair enables students to showcase their work and receive feedback from judges and mentors. Understanding student and teacher motivations to participate in competition events can help increase participation. To understand the perceived barriers of teaching and facilitating agriscience research, a survey was sent to Kansas agriculture teachers (N=223) in January 2017. A response rate of 35% was obtained (n=79). Teachers responded to four open-response questions. The responses were analyzed for common themes using the constant comparison method. Major findings included: a lack of time to facilitate, complete, and teach the components of agriscience research, lack of experience with the event, lack of knowledge regarding research, and lack of resources. Teachers offered advice regarding the event which included increased awareness of the competition, a need for professional development, and curriculum revisions. Recommendations include encouraging more research-based SAEs, inclusion of inquiry-based projects into the existing curriculum, professional development from agriscientists, and training preservice teachers in basic research methods. Further research is needed to investigate the expectations and values tied to conducting agriscience research and participating in the FFA Agriscience Fair to meet the demand for agricultural scientists.

062

Developing the Next Generation of Water Advocates

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The Education and Public Outreach Supplement of the Long-Term Vision for the Future of Water Supply in Kansas specifically states the need to, "Increase awareness and knowledge of Kansas youth on water-related issues through K-12 education and beyond-the-classroom opportunities." The Kansas Youth Water Advocates Conference (KS-YWAC) was developed as a way to train youth about water topics and get them the skills needed to speak about key issues. Eleven students attended the conference July 12-14, 2017 in Manhattan, KS. The conference included both water specific and communication focused sessions. IRB approval was obtained in order to collect data from the students on their water-focused knowledge, public speaking self-efficacy and conference satisfaction. The results of the knowledge assessment showed positive improvements from pre (M=8.64, SD=0.41) to post-conference (M=12.18, SD=0.66). The average score increased by 23% (from 58% to 81%). A paired-samples t-test showed both the knowledge assessment ($t(10) = -9.63, p < 0.01$) and the public speaking self-efficacy assessment ($t(10) = -8.70, p < 0.01$) were statistically significant. The post conference satisfaction survey yielded a mean of 4.56 (SD=0.37) out of five. Students were satisfied with the conference and it increased their knowledge on water-related topics and public speaking self-efficacy. More research is needed to increase the effectiveness of this program and how to best extend the influence throughout the advocate's full year of service. Additionally, a Western Kansas YWAC has been scheduled for March 2018.

063

Increasing Impact via News Feed: A Model for Research to Practice

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There exists a divide between research and practice, to the detriment of those both conducting research within colleges of agriculture and practitioners considered to be potential benefactors of that research. While research and development within colleges of agriculture have the potential to further the industry nationwide, many of the impacts are lost within the pages of academic journals and hidden at the end of trails of website tabs, never to be consumed by the practitioners for which the research was conducted. To bridge the divide between research and practice within agricultural education, three faculty members from different institutions created Owl Pellets: Practical Tips for Agriculture Teachers. The objective of the project was to identify key research-based solutions for secondary agriculture teachers and disseminate them in a concise and attractive platform conducive to practitioners. Relevant topics are identified and experts in the respective topics are recruited for podcast and video interviews. Research is also converted to easily consumed infographics which are published and then shared through the Owl Pellets social media sites. Through a series of five posts each week, the Owl Pellets sites have created over 200 research-based consumables for practitioners. Currently over 2,300 individuals follow the Facebook page with some posts reaching over 8,000 people. This model could be used by faculty in other disciplines within agriculture to share the implications of their research with those in the field and the general public.

064

Bridging the Gap: A Survey of Student Perception

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Today, students have several inherent expectations that are rarely voiced, yet clearly anticipated. The objective of this survey was to determine how students' viewpoints change during their academic career regarding what they expected of Student/Instructor interaction. To accomplish this, animal science students (n=406) completed surveys recording their demographic information and answered questions concerning their expectations as students including what they expected of instructors. Distributions of responses were compared using chi-squared analysis with pairwise comparisons to determine differences between student classifications. However, because multiple pairwise comparisons can lead to errors, comparisons were limited to the change occurring during an undergraduate degree and students entering graduate school (senior to graduate). Changes in student viewpoints were observed in 3 of the 7 questions pertaining to student course expectations. When asked, 1) if instructors should remind students when assignments are due after initially assigning the task, 2) if instructors should be upset if students respond to texts or leave the classroom to answer phone calls during class, and 3) if students should be able to come and go as they please without penalty because they paid for courses, there were significant changes ($P < 0.05$) in the distribution of responses from seniors to graduates. However, during their undergraduate coursework, there was no deviation in perception, indicating that student expectations of instructors were unchanged. While this can be disheartening, it is important to remember that in order to excel at teaching, one must first understand the thought process of those being taught.

067

Guidelines for Developing Instructional Modules to Improve Students' Communication Skills

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Universities, and more specifically colleges of agriculture, are increasingly expecting faculty to incorporate communications curriculum into their courses. These skills are critical as the agricultural industry continues to face challenges in effectively communicating with lawmakers and the public. However, faculty in the agricultural and food sciences are often experts in specific areas of science and topical areas and not in communication or communication teaching methods. One approach to meeting this need is the creation of stand-alone, reusable learning modules faculty can use to teach communication skills. Adoption of the modules can be challenging if the modules do not meet delivery needs of faculty. Qualitative conversations with three industry leaders and seven faculty members revealed critical design considerations to guide the development of instructional modules as part of a funded USDA-NIFA project. Such design considerations included context-specific examples, easy-to-use format, engaging content, method for tracking completion, and a facilitator guide. The participants also expressed that, for the modules to benefit students and make the students more employable, it is critical the examples in the modules accurately reflect industry experiences. For instance, industry representatives expressed that lengthy term papers were not as beneficial as knowing how to write an effective executive summary, create an engaging presentation, or write a concise email. As institutions continue to request faculty to teach writing/communication-intensive courses and continue to place additional instructional responsibilities on faculty in the agricultural and food sciences, it is imperative that they have access to resources to assist them with content and delivery.

This project was supported by Higher Education Challenge Grant no. 2017-70003-26386 from the USDA National Institute of Food and Agriculture.

068

Scientific Communication: Using Reusable Learning Modules to Enhance Communication in Agriculture

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The need to train scientific communicators is evident across disciplines in the food, agriculture, natural resources, and human sciences (FANH). This United States Department of Agriculture Higher Education Challenge project focuses on strengthening students' communication skills using learner-centered, reusable learning modules (RLMs). In consultation with faculty in the FANH sciences and industry advisers, we developed communication curricula to enhance communication education and meet the employment needs of the broad agricultural industry. The curricula are based on seven characteristics 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. Faculty at Texas A&M University and Prairie View A&M University are delivering the curricula in face-to-face, hybrid, and stand-alone delivery modes; in multiple learning management systems; and in existing courses as supplements to the current curricula following a RLM format. The RLMs are unique because they are context specific to animal, plant, and poultry sciences and they include industry-specific examples to facilitate the teaching and learning of communication techniques within agriculture. They integrate audio, video, interactions, and text to engage the learner and incorporate learning opportunities that allow students to reflect and compare their communication techniques with industry expectations. To ensure RLMs meet faculty, students, and industry needs,

we are measuring the impact of the RLMs using student assessments (formative, summative, and pre/post); faculty feedback; and industry review. After pilot testing the RLMs, we will disseminate them broadly for use in fall 2019.

070

Plant Conservation Curriculum: What is Being Taught Versus What is Being Sought

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Plant conservation is an interdisciplinary field comprised of professionals needing skills in threatened or endangered plant management and an ability to collaborate with a variety of stakeholders. While college curricula teach the principles of conservation, it is unknown whether faculty are providing real-world training for the skills needed by industry professionals. The objectives of this research were to: 1) compare plant conservation-related college syllabi from schools in different geographic regions of the United States (what is taught) with a needs assessment of industry professionals (what is sought) and 2) recommend curricular changes to best prepare graduating students. College syllabi were reviewed to identify the plant conservation content currently being taught and determine how students are being assessed in their skill attainment. Findings were used to design a Delphi needs assessment of skills needed in recent graduates according to industry professionals. Assessment results indicated that students need more content knowledge in plant science, conservation policy, and ecology as well as skills in fieldwork, working and communicating with others, and solving problems. Based on these findings, faculty should consider integrating assignments emphasizing service-learning, outside partnerships, teamwork, critical thinking, communicating results, and applying theory and content to solve real-world, interdisciplinary problems. Service-learning builds content knowledge, field skills, and soft skills simultaneously while also promoting student recruit-

ment. Student assessments could focus on solving management challenges for a species or developing plant-focused educational programs for youth, with findings then being communicated to a panel of experts within a partnering organization.

071

Is the Virtual Grass Greener? Video Game Simulation Used as a Teaching Tool

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As our world becomes more technologically immersed, college instructors are increasingly challenged when generating and maintaining student interest. While increased technology use can be a detriment to student learning in some instances, it can also be seen as an opportunity to enhance learning. The objective of this project was to utilize a video game simulation, "Farming Simulator," to enhance student comprehension of economic decision-making principles in undergraduate farm management courses at two non-land grant colleges of agriculture during the spring 2018 semester. This game allows players to produce crops/livestock, "purchase" machinery, and make various production decisions. Courses were comprised of 30 to 60 students, and groups of 3-4 students were assigned a whole farm management project using the simulation game. Initial farm size and budget constraints were given. The duration for project completion was approximately two weeks. Each group was tasked with making economic decisions related to production, equipment, and land management. Classroom assessment techniques (CATS) were used to assess student learning throughout the project. Results indicated that students enjoyed using the novel video game approach, although software limitations impacted the ability to make some economic decisions, such as risk management decisions. CATS results also indicated that the project

supported increased comprehension in the areas of economic production decisions, cost concepts, business planning, and financial/investment analysis. Additionally, students also provided feedback on ways in which video game simulation use could be improved for future classroom applications.

072

High School GPA and ACT Scores as Predictors of "On-Time" Graduation

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Universities and colleges of agriculture face increasing public pressure to graduate B.S. students within four years of their entering as freshmen. We examined composite ACT scores and high school grade point averages (HSGPA) for new, first-semester freshmen (N=2755) entering a College of Agricultural, Food and Life Sciences from 1998 to 2012 to determine if these pre-entry academic variables could predict on-time (four-year) graduation. Over the 15-year period, the mean composite ACT score was 24.49 (SD=3.67) and the mean HSGPA was 3.53 (SD=0.44). The overall four-year graduation rate was 43.4%. Composite ACT scores and HSGPAs were converted to z scores and used as predictors of four-year graduation in a binary logistic regression model. Both predictors entered into the model and the overall model was statistically significant, $\chi^2(2) = 363.19$, $P < 0.001$. The model correctly predicted the four-year graduation status of 70.2% of students. The odds ratios (OR) indicated each one standard deviation increase in ACT score (increase of 3.67 points) increased the relative odds of four-year graduation by 14% (OR=1.14). Each one standard deviation increase in HSGPA (increase of 0.44 points) approximately doubled the relative odds of on-time graduation (OR=2.09). These results indicate pre-entry academic characteristics (composite ACT score and HSGPA) can predict on-time

graduation. High school grade point average was a more robust predictor of four-year graduation than was composite ACT score.

073

Introductory Organic Agriculture Curriculum for Undergraduate Students

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Organic agriculture course offerings continue to become more common at colleges and universities in the United States, and often reflect instructor expertise or regional issues of concern. The goal of this project was to develop multi-regional organic agriculture undergraduate curriculum at the introductory level for diverse student audiences. We interviewed 19 faculty members that teach on the topic of organic agriculture to identify the most important concepts and skills students should grasp. Seven respondents were located in the South, five from the West, four from the Northeast, and three from the North Central region. Interviews were conducted by phone, audiorecorded, transcribed, and then coded for themes to highlight the most prevalent responses. Respondents varied across position type, department, institution type (including land-grant and non-land grant), and years of experience teaching on the topic of organic agriculture. Based on their responses, we developed a working framework adapted from the Next Generation Science Standards. Within this framework, we created teaching modules for the following critical and needed topics: certification, livestock production, and social dimensions. These modules include lesson plans, supplementary materials, and resource lists. We also have additional lesson plans for organic seed, history, and marketing. Original short films based on interviews with six certified organic farmers and ranchers are used throughout the modules. Module testing consisted of use of all resources in a single class at the University of Wyoming and sharing individual modules with participating faculty from other institutions to seek feedback.

075

Facilitating Faculty Development for Classroom Excellence

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Oklahoma State University's College of Agricultural Sciences and Natural Resources (CASNR) Academic Programs has developed a teaching improvement program called PETE's, Peers Engaging in Teaching Excellence. The goal for PETE's is to become a go-to program for faculty to further develop and enhance classroom excellence. A primary component of PETE's is the Peer Coaching of Instruction Pilot Program, designed for CASNR faculty to develop a culture encouraging teaching faculty to utilize peer coaching as an opportunity to share ideas, techniques, and best practices, with the ultimate goal of making classrooms more effective and engaging. This program provides faculty members opportunities to collaborate on their teaching in a collegial setting. Importantly, this program is not a peer evaluation for annual appraisal or promotion and tenure documents. Rather, it is meant to be a reciprocal peer-to-peer coaching program—in that, each team member will receive structured comments concerning their teaching, while also providing feedback to their peer, featuring observations and reflection on strengths as well as recommendations for improvement. Initial responses of faculty participants indicated only 35% were familiar with CASNR teaching faculty outside of their home department. Additionally, 35% of participants stated they were effective or highly effective in their teaching methods and in self-assessment of their teaching. Lastly, 80% of participants stated they were likely or highly likely to apply what they gain during their coaching experience to their future teaching. Post-survey results of Peer Coaching participants will be collected in May 2018 and presented at the conference.

081

Effects of Note-Taking Pairs on Students' Reading Retention of Scientific and Popular Press Articles

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The effectiveness of note-taking pairs (NTP) on student reading retention of scientific and popular press articles was evaluated with students ($n=108$) in an undergraduate Dairy Cattle Science course. Throughout the semester, students were randomly assigned either a scientific or popular press article with or without the note taking pairs/discussion exercise: PPD–Popular Press, Discussion; PPND–Popular Press; No Discussion, SD–Scientific, Discussion; SND–Scientific, No Discussion. Each student was assigned each treatment twice throughout the semester. For the PPD and SD treatments, students had one week to read and take notes on the assigned article and discuss those notes during class with a partner while the PPND and SND only had to read the article. The following day, students had ten minutes to complete a quiz over the article material. Overall, no differences ($p>0.05$) were observed in quiz scores between students with or without the NTP exercise. Students assigned the NTP activity performed better ($p=0.05$) on quizzes in two of the eight popular press articles while students who were not assigned NTP performed better ($p=0.05$) on 3 of the 8 articles. There were no differences ($p\geq 0.05$) in perception of increased retention of the material between the popular press and scientific articles based on student surveys. However, students rated the activity of note-taking higher ($p<0.05$) in efficacy of retention than discussion with a peer regardless of whether it was related to the scientific or popular press articles.

087

Thinking Well – Scaling Research through Critical Conversations

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How people think has become as important as what we think – especially in agriculture. Many have documented the failure to utilize research findings to create dialogue, and discourse, around important topics. Social media has promulgated societal issues through critical discourse. A team of three researchers asked, “how could we spur critical conversations that highlight research and require community members to think well, while discussing a challenge?” This question led to a podcast series called Critical Conversations. These conversations sought to bring forward an important and provocative issue, present research relevant to that issue, and invite members to have a research focused conversation about the challenges and solutions. To date, six different critical conversations have been posted to the accompanying social media site. Those posts have been provided as audio-only podcast files, as well as YouTube videos that include both the audio and the video of the actual conversation occurring. We have found that the podcasts situated around a critical issue have received more interest than those simply presented as informational. The team also found that posting the video version of the podcast has received more attention. We posit the video format draws on society's desire to engage in discourse and connect with the argument at hand. The critical conversations have reached 14,321 people through the six podcasts. Individual podcast counts have ranged from 521 to 5,200 people reached. Interestingly, those conversations with the most discourse were also the most engaging.

088

An Evaluation of Science Communication Workshops for Florida Extension Agents

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Extension agents are responsible for the increasingly difficult task of communicating evidence-based information about contentious issues to their stakeholders. To help prepare Florida agents to communicate about their focus area in agricultural and life sciences, a series of workshops on science communication was delivered to Extension agents across Florida. The communication workshops included modules on working with reporters, using social media, crafting a narrative, and developing communication in a crisis to teach agents how to better communicate the value of science in their focus area. The purpose of this presentation is to describe the evaluation of the science communication workshops. Extension agents (n=172) attended the workshops in Florida's five Extension districts. A retrospective pretest-posttest was used to determine the agents' perceived communication abilities before and after the workshops. The pretest-posttest consisted of 20 Likert-type questions that reflected communication skills and strategies discussed in the workshops. A paired t-test found the perceived competency for each skill/strategy was statistically higher after the workshop ($p < 0.01$). The largest differences were in respondents' perceived ability to organize a story about science, implement good story telling techniques when communicating about science, and developing a crisis communication plan. Four additional questions indicated the respondents agreed they would use the information they learned from the workshops in the future. The results from the evaluation indicate the workshops were successful in teaching science communication strategies to Florida Extension agents and can serve as model in other states.

090

Improving Student Success and Engagement in a Biochemistry Lab Course

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There are increasing challenges in maintaining and improving student outcomes in lab courses for a variety of reasons, including the relatively limited time students spend on experimental tasks, to the low credit hour to contact hour ratio. This study aims to identify factors that directly affect student engagement and success in a non-major's lab course, which will contribute towards best practices in lab course development and implementation. Factors investigated included course structure, content delivery, assignments, assessment strategies, remediation, and faculty presence during the lab session. The biggest single factor affecting student engagement was faculty presence. When the lab sections were run by TAs without faculty present, the students were more 53% more likely to have negative comments about the course. Data suggest that interventions in overall course structure and customized remediation opportunities for students lead to significant gains in student engagement and learning. Assessment in practical skills significantly improved outcomes. "Flipping" the lecture delivery from in-class to online, did not have any impact on engagement or outcomes overall, however there was a correlation between when and how long students spent watching videos, and subsequent exam scores. It is hoped that these results will help validate the impact of undergraduate lab courses and justify the commitment of resources. Structuring lab courses effectively and efficiently, and assessing lab learning in a way that ensures students receive quality instruction and feedback, and are achieving the desired outcomes, will mean that the benefits of these courses justify the costs by both faculty and students.

094

Continual Study of Factors Influencing Freshmen Decisions to Major in Agriculture

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To better understand students' motivations and influences, increasing effectiveness of recruitment strategies and messaging, the Purdue University College of Agriculture surveyed first semester freshmen enrolled in "AGR 10100: Introduction to the College of Agriculture and Purdue University" for four consecutive years. Students were required to complete the survey describing factors influencing their choice of major as a small assignment in the course; they gave or denied permission for their responses to be used in this research study. With 2,303 responses, the research team now has a 97.46% representation of their AGR 10100 course enrollment for the fall of 2014, 2015, 2016 and 2017. Demographically, 61% (n=1,403) of the responses were female and all academic departments were represented. Students self-identified as 47.4% (n=1091) involved in 4-H and 36.5% (n=841) involved in FFA; 42.9% (n=989) were not involved in either organization. The dominant factors for their choice of major were: i. making a difference in their career, ii. relationship to their hobbies, and iii. future job market. College-specific campus visits and tours were valuable in deciding to choose their Agriculture major at Purdue. Interestingly, social media, webpages, and online videos were not influential with regard to the choice of Purdue Agriculture. The top 5 influencers regarding their choices of a major were, in order of decreasing impact, parents/guardians, family members, friends, Purdue students/alumni, and high school science teachers. This data is useful for universities, colleges of agriculture, and specific departments to identify factors and influencers for their current and prospective student populations.

095

Flipping a Classroom into a Congress to Incite Learning about the Policy Process

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Traditional lecture-based courses routinely pose challenges to faculty in delivering enriching and memorable learning experiences for their students. To enliven and enrich the learning experience in a course about natural resource policy and administration, a subject not routinely perceived by students as very exciting or stimulating, the class is organized into a bicameral legislative body and tasked to articulate a Natural Resource Bill of Rights following the usual protocol and procedure of the Congress of the United States. Students take on the roles of Senators and Representatives, form subcommittees and conference committees, assume congressional leadership roles, engage in debate and deliberation, hone formal writing skills, deliver oral presentations, and ultimately arrive at collective consensus through formal votes, mimicking the routine process followed in our nation's Congress. Rather than just hearing about the process or watching it on video during class, students engage in the actual process. They become the process and live the process firsthand. Seven sessions of Congress and other committee meetings are scheduled across the semester. Ultimately, the noteworthy and memorable outcome of this experience is not necessarily the final printed product, a Natural Resource Bill of Rights that resembles our nation's Bill of Rights in form and structure, but the actual process of learning and gaining understanding through role-playing in a real-world, relevant, and timely scenario that has been a critical element of our society throughout our history.

096

Enhancing the Professional Dimension of Undergraduate Capstone Experiences

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Capstone courses are culminating components of many undergraduate curricula. Many include real-world scenarios to enhance the learning process. Our objective for the Forestry capstone course at Oklahoma State was to elevate the real-world context to a higher level. Our aim is to integrate students' learning, knowledge, analytics, and problem-solving skills targeting a real-world client with a real-world problem, circumstance or ambition, for a real-world property. We organize our capstone experience as the "Forestry Capstone Consulting Firm," simulating a professional business enterprise. The course instructor serves as Chief Executive Officer (CEO) of the firm, supported by a Board of Directors comprised of three other faculty. These four faculty represent the four key areas of knowledge that serve as the foundation for our profession. Students are formed into consulting teams that operate in a work-place environment with an ethical framework. They embrace equity in leadership and responsibility; they confer with their clients to gain an understanding of their objectives and ambitions; they formulate a goal-oriented work-plan with a realistic timeline and budget; they conduct fieldwork, research and analytics in readiness to prepare a long-range, practical, prescriptive management plan; and ultimately deliver the plan to their client in a formal professional presentation. Final course grades include assessment of the student experience and final product by the CEO, the Board, and the client. A student peer evaluation is also incorporated to mimic the real-world scenario of appraisal and development that is prevalent in our professions.

097

People, Plants, and Puppies: Developing Service Learning Opportunities Across the Curriculum

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University faculty members sometimes utilize service learning (SL) as an experiential teaching method. SL enables students to apply knowledge from traditional content delivery in a real-world setting, while also serving others. Millennial college students often prefer experiential learning activities beyond traditional methods (i.e. lecture). SL provides a great opportunity to build such meaningful educational experiences. The current study utilized a qualitative case study design to examine lived experiences of students and faculty at the University of Tennessee-Martin who experienced SL in a variety of disciplines. Agriculture business and agriculture engineering students participated in travel studies and served impoverished people in other countries through projects to improve quality of life. Agriculture education students completed volunteer hours at an urban farm located in a large metropolitan city. Veterinary science students worked with animal shelters to provide preventative medicine and surgery. Students responded positively and voiced interest in continuing participation after project completion. Specifically, the following themes were recounted by faculty of student's experiences: sense of purpose and making an impact, challenges of applying theoretical learning in the real world, and increased global awareness. Experienced SL challenges included time commitment, liability issues, project expenses, and students' negative preconceived beliefs. Overall, these experiences required a change from the traditional lecture methods to providing more connection between classroom material and real-world application desired by students. A recommendation for educators would be choosing and incorporating appropriate SL experiences that closely align students' personal and career

interests, student learning outcomes, and existing community needs.

098

Impacts of Short-Term Agricultural Study Abroad Programs

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Domestic agricultural commodities are export dependent while the diets of many American consumers rely on high-value imported agricultural products. As United States agriculture and the global economy are increasingly interdependent, agribusinesses are looking for employees able to leverage international experiences. NAFSA recently reported that over 1.6% of US college students studied abroad for academic credit in 2015-16. Of these, over 55% study on short-term, faculty-led programs. Regularly cited impacts of study abroad programs include language development, intercultural and personal development, and career choices, although these impacts usually come from post-hoc survey data of students participating in longer-term programs. This research analyzes the impacts short-term agricultural study abroad programs have on students' insights of the world, their knowledge of global agriculture, and their lives. Data was collected from over 30 real-time, student-written journals, completed on different agricultural study abroad programs designed and offered by the same faculty. Data was analyzed using a qualitative analysis program to identify word frequency and themes. Frequent words included "people," "difference(s)," "products," "cattle," and "business." Frequent verbs included "think," "experience," "going," "process" and "believe," and contextually were included in relational statements, which are associated with the analysis and synthesis levels of Bloom's Taxonomy. The impacts of these programs on students varied by country, but collectively focused on awareness about segments of the agricultural supply chain, feeling more knowledgeable about the roles that agriculture serves

in different economies, the significance of institutions to agriculture, and an ability to relate to those employed in agriculture in other countries.

099

Eww, You're Eating It: Innovative Approaches to Conquering Fear of the Unknown

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AGSC 356, Plant Nutrition and Soil Fertility Management, is a course required of Crop Science, Horticulture, and Sustainable Food and Bioenergy Systems students at Montana State University. During the first week of class, students are given a reading assignment and subsequent quiz question designed to assess vulnerability to logical fallacies associated with irrational fear of chemicals, particularly plant nutrient ions and common fertilizer salts, as well as nature's universal solvent. Ignoring the possibility of satirical responses from students, a majority have predisposed fears and misconceptions about ions essential to both plant and human nutrition. While tackling the complex environmental issues surrounding nitrogen and phosphorous in the environment, we also use humor, popular culture references, gastronomy, and readings from clickbait journalism corroborated by peer-reviewed science to overcome these semi-rational fears. What exactly was it about spinach that gave Popeye his superhuman strength? Why do some hot dogs contain cultured celery juice and cherry powder? What do premium charcuterie, Dutch licorice, V8™ low sodium vegetable juice, and Newman O's™ crème filled vanilla cookies made with organic flour and organic sugar have in common? They all have ingredients also used as fertilizers in crop production. Which fertilizer salts can be found in nature and are therefore allowed organic farming? Learning outcome assessment indicates that students benefit from pondering these questions while eating salty snacks.

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Using Flipgrid© to Assess Student Reflection

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As a function of the learning process in a teacher education program, we encourage teacher candidates to re-think their own points of view and transform potential biases, so they may become more effective educators. Reflection promotes transformative learning, which bolsters lifelong learning. We also acknowledge assessments can serve multiple purposes in education and should go beyond traditional concepts of grading. We sought to provide a unique platform for critical reflection to encourage transformative learning, measure what and how students were learning, as well as evaluate our own pedagogical practices. Therefore, we implemented Flipgrid© technology, a video discussion platform where topics are added, presumably by the teacher, and discussion and discourse take place through students posted 90-second video responses. The students responded to weekly prompts and received feedback from the instructor via email. The weekly responses provided a chance for the instructor to check-in with students on how they were processing and applying the information in class. It also allowed for one-on-one feedback in a unique way and time-efficient manner. There was positive feedback from students and the instructor; 71% of the course participants enjoyed using Flipgrid© and 86% saw the benefit in using Flipgrid© to reflect. Students found value in the frequent opportunities to reflect and verbally process their own thoughts, while also engaging in discourse with classmates digitally. From the instructor perspective, Flipgrid© provided structured reflections that proved to be an effective way to formatively assess students' learning and development, which encouraged transformative learning in these preservice teachers.

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An Allelopathy Experiment: A Simple and Inexpensive Hands-On Learning Experience

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Allelopathy plays crucial roles in invasive plant viability and agricultural production systems. However, there is no well-established hands-on learning activity to teach the concept of allelopathy. Nor is there an activity which allows students to gain knowledge about glucosinolates and their corresponding enzyme, myrosinase, which are present in almost all brassica crops. This study explores an inexpensive and easy allelopathy lab activity for undergraduate students majoring in biology, agronomy, and/or horticulture. Students were split into groups throughout the experiment. Lettuce germination was counted from three different treatments including water-treated with Parafilm sealing, horseradish-treated with Parafilm sealing, and horseradish-treated without Parafilm sealing 22 hr after seed sowing by the students. Additionally, lettuce root length was measured by students using ImageJ software from each treatment using pictures captured by students' smartphones. Students took an identical quiz as a pre-lab and a post-lab assignment. Their average scores on the pre and post-lab quizzes were 3.2 and 6.5 out of 10, respectively, indicating the lab activity significantly improved students' understanding of allelopathy and glucosinolate-myrosinase system ($p < 0.01$). In addition, students ($n=76$) completed a survey post-lab to assess their self-efficacy. A vast majority of students agreed "I can utilize a smartphone to collect data for plant science experiment" (88%), "The lab activity improves my knowledge on weed suppression mechanism of brassica cover crops" (83%), and "The experiment was designed to improve my knowledge on allelopathy" (84%). This simple and cost-effective lab activity was very helpful as it made learning more inviting, meaningful, and fun.

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Panel Discussion as an Effective Instructional Strategy Influencing Student Perceptions

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Faculty use a variety of instructional strategies in agricultural leadership education courses, but little impact on student learning, perceptions, and awareness is reported. This study examined the effect of a panel discussion on the perceptions and awareness of undergraduate agricultural leadership students (N=52) toward women agricultural leaders, a multifaceted topic. A Women in Agricultural Leadership panel discussion was held at the end of the term, with four women from various sectors, professions, and generations in the industry represented. The goal of the panel discussion was to help students synthesize course concepts related to gender diversity and authentic leaders' ability to influence positive organizational climates. A six item, retrospective pre- and post-test evaluation survey was administered. There were significant increases in awareness and understanding between pre-test and post-test perceptions for the six items related to: (a) awareness of the unique challenges and opportunities faced by female leaders within the industry (61.6% to 93.4%), (b) understanding of potential issues related to work-life balance (61.6% to 90.4%), (c) understanding of the benefits of positive mentoring experiences (48.1% to 92.3%), (d) understanding of how relationships between men and women working together in the agricultural industry has changed over the years (50.0% to 96.2%), (e) differences in how men and women lead (48.0% to 75.0%), and (f) diversity awareness (76.9% to 98.1%). Researchers recommend educators consider integrating panel discussion as a teaching strategy when the objective is to encourage conversation on complex topics by challenging perceptions and awareness of undergraduate agricultural students.

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Blending: Utilizing Multiple Live and On-Demand Platforms for Purposeful Professional Development in Global Learning in Agriculture (#GLAG18)

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With wide-ranging instructional technologies available, those who design professional development in formal or non-formal settings are challenged to select the most accessible and appropriate platforms to actively engage participants with purposeful growth and development. To address global learning in agriculture with educators who are formal, non-formal, and informal as well as at the secondary and post-secondary level across the multiple time zones and continents, the Global Teach Ag Team chose multiple platforms for the 4th global learning in agriculture conference including: Voice Thread, Zoom, Adobe Connect, and Twitter. Twelve "On-Demand" presentations created a total of 203 minutes on VoiceThread that viewed over 161 times with 210 comments left in the video. Four Zoom "Roundtables" occurred addressing specific essential questions with 100 total participants. Twitter as a primary back channel conversation from January 22nd to January 26th had 1,425 posts from 119 users that reached 392,122 accounts and yielded 1,121,917 impressions. For the live conference in Adobe Connect there were three presentations, one keynote, and one interactive workshop. Total registration for the event was 144 in addition four universities (Purdue, Michigan State, Nebraska and Iowa State) hosted watch parties. Representation was from 120 institutions in 34 states and 6 nations. Of the evaluation respondents, the participants strongly agreed that "The event technology met the needs of the conference." Pragmatic practice for implementation of this technology platform for wide-ranging asynchronous professional development will be shared with conversation around translation to other contexts and content.

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Cultivating Digital Leadership in Pre-Service Teachers: #psuaged18

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Internet based technologies are an integral part of the educational classrooms at secondary and post-secondary levels. Instructors are encouraged to create a positive digital presence through various social media platforms, keep classroom blogs and websites to communicate information with students and stakeholders, and may even participate in video teaching evaluation. To prepare pre-service teacher candidates, it is critical to engage them in their professional development on multiple platform with varied purposes as we move them from digital citizens to digital leaders in their schools and communities. Additionally, they must be efficacious in helping cultivate digital citizenship in their future students. Candidates were asked to utilize individual professional blogs, Twitter with connections to class, cohort, and virtual mentors, as well as video capture platforms for feedback like Swivl and Edthena. All come together to create a digital ecosystem that cultivates a reflective disposition and provides opportunity for innovation expansion with cooperating teacher/mentors. The ability to cultivate digital citizenship and experience new and different forms of educational technology during the teacher preparation process will help create digitally and technologically literate and savvy teachers who are ready to take on the challenges of the twenty first century classroom. Presentation will focus on best practices that can be translated to a wide variety of disciplines for the shared task of preparation of digital advocates for food, fiber, and natural resources.

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Training Students to Attend a Conference: Social and Career Outcomes

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Scientific conferences build professional skills and a professional identity in undergraduate students. Conferences also provide opportunities for developing professional social skills, a sense of belonging to a career field, and an understanding of potential career options. However, undergraduate students rarely attend these meetings. When undergraduate students do attend, they often express anxiety associated with speaking with professionals, networking, or with the conference environment. To address these concerns, instructors from several institutions collaborated to develop an undergraduate course with the course objective of training students to attend their first professional conference and then traveled with them to experience a conference. The course framework involved meetings with students and course assignments before, during, and after the conference along with hierarchical mentoring throughout the process. Overall, student feedback was positive and indicated that student experiences were enhanced through enrollment in the course. Assessment results indicated that student outcomes included a greater sense of belonging to their profession, social benefits, gains in confidence, career confirmation, an improved understanding of the pathways to pursuing a career in this field (i.e. importance of undergraduate research, gaining experience during

college, early career experience, etc.), and a general increase in students' interest in attending graduate school. Our results suggest that formal preparation for attendance at a national scientific meeting maximizes the potential for students to benefit from their experience and reduces the anxiety many students feel about attending a professional conference.

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How Does the Use of a Smartphone-based Technology in Teaching Influence Learning Outcomes?

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University of Wisconsin-Extension offered 27 field days to USDA employees on a wetlands screening tool. The objective of this pilot evaluation study was to test if using Kahoot (a knowledge-check game on smartphones completed by individual student) vs Whiteboard (groups of students collaborating to provide answers) tool in teaching had significantly different influence on the learning outcomes. Eight field locations used Kahoot (n=203) and 19 locations used Whiteboard (n=413). The intervention (Kahoot) was not randomly assigned to field days but was based on instructor preferences. Surveys were administered at the end of the field days to measure the self-perceived knowledge and comfort levels on a five-point Likert type scale after attending the field day. An independent samples t test indicated that there were no statistically significant differences between the two groups on all the outcome variables at 0.05 level of significance (six knowledge and six comfort related variables treated as Likert-type items). However, qualitative reflections by the instructors who used Kahoot suggested that the game was learner-friendly and engaging. The constraints with using Kahoot were related to the non-availability of smartphones and age, with older students less likely to participate actively. Future studies should

explore the influence of age on engagement with Kahoot. We intend to use this teaching tool in other projects and test if it yields statistically significant differences on learning outcomes. Since this game is available for free download, we recommend instructors in formal educational settings also to try this method in their teaching.

116

Buzz Group Methodology: Setting the Hive in Your Own Classroom

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Active learning in the classroom helps students acquire a better understanding of interpersonal skills and can further drive critical thinking, application, and problem-solving skills. Engaging methods are needed to capture student interest, as using lecture-only in a classroom, namely a leadership classroom, is not an effective measure to reach students. To promote active learning, think-pair-share pedagogical methods are commonly used to encourage student engagement via working in pairs to discuss course content. However, a new method is needed for encouraging similar rich active learning in high-enrollment classes. In buzz groups, students in large-sized classes are given a discussion point and then asked to either share their views on the topic matter or learn about a specific construct in their small groups. Groups then share their discussion points with the rest of the class. The presenter found that buzz groups empower students and change the way course content is delivered. This form of peer-instruction and discussion helps deliver class material in an unconventional way and allows the students to be proactive with their own cognition and application. This presenter will discuss how he applied buzz groups in a large leadership course at a land-grant university, as well as define relevant terminology and provide recommendations for buzz group implementation strategies.

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Pre-Service Students' Beliefs about Teaching STEM in Agricultural Education

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Empirical evidence demonstrates that educators need more expertise in science, technology, engineering, and mathematics (STEM) to prepare students to solve complex problems. The current study sought to understand the beliefs of preservice agricultural education students at an 1890 land-grant university regarding teaching STEM in agriculture. A Q-methodology approach was used to achieve the purpose. Central to Q is concourse theory, i.e., the range of views on a topic. To develop the concourse, we analyzed participants' reflections, literature, and interviews to create 221 statements. Ajzen's theory of planned behavior then served as a lens to sample 36 statements from the concourse. Thereafter, 20 p-set members (participants in Q) sorted the statements onto a quasi-normal distribution curve. Statistical tests were also performed on individual sorts, including principal components factor analysis, which yielded three factors. Through qualitative analysis of the factors, three beliefs emerged: STEM Champions, STEM Protégés, and Emerging STEM Educators. STEM Champions advocated for teaching STEM because it complemented the curriculum and could help students succeed in the 21st Century. Meanwhile, mentors who emphasized the importance of STEM primarily shaped the beliefs of STEM Protégés. Finally, Emerging STEM Educators held positive views but also desired more proficiency in STEM. This study provided critical implications for teacher preparation concerning the importance of identifying students' diverse beliefs and perspectives. Perhaps using this knowledge to tailor curricular activities to address their underlying beliefs could resonate more deeply with preservice students and influence their future practice regarding teaching STEM in agriculture in positive ways.

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Empowering Preservice Agricultural Education Students in STEM through a Service-Learning Project

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Scholars have called for more attention to methods of instruction such as service-learning (SL) to better prepare students for life after graduation, especially regarding equipping them with the skills needed in science, technology, engineering, and mathematics (STEM). As such, 20 preservice agricultural education students engaged in a semester-long SL project with the intent of empowering them in STEM. The SL project required students to develop educational seminars focused on introducing underrepresented populations to STEM concepts in agriculture. A qualitative case study approach was used to distill meaning from participants' experiences using data from individual interviews, participant submitted photographs, and reflective journals. Four themes emerged representing the process of empowerment in STEM: (a) questioning self, (b) interpersonal shifts, (c), redeveloping self, and (d) a reconstructed STEM identity. Initially, students experienced dissonance as they questioned their ability to facilitate STEM learning. However, after engaging in lesson planning and improving their self-efficacy regarding teaching, they reported interpersonal shifts and a refined sense of self. After completing the SL project, their perspectives continued to mature through reflection on their experiences as they began to perceive themselves as educators who could facilitate STEM learning. This investigation provided evidence that preservice students at an 1890 land-grant university can gain mastery over their STEM knowledge and skills through well-designed SL projects and purposeful reflection on such experiences. Moving forward, it is recommended that teacher preparation programs of agricultural edu-

cation design and deliver SL with the intent of facilitating preservice students' empowerment in STEM.

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Comparing Critical Thinking Conceptualization of Faculty In and Outside Colleges of Agriculture

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Critical thinking is a complex concept that most faculty have been asked to understand, teach, and evaluate. The objective of this study was to understand how faculty in colleges of agriculture conceptualize critical thinking verses faculty outside the college. The researchers used the creation of mind maps to introduce critical thinking to the two groups of faculties participating in workshops on critical thinking. The Elements of Thought were used as the conceptual framework. The mind maps were analyzed using deductive analysis based on these elements which include: Purpose (objective of reasoning), Questions (questions to be answered), Information (using relevant data in reasoning), Inferences (does data support conclusions), Concepts (theories guiding reasoning), Implications (consequences from your reasoning), Assumptions (assumptions made), and Points of View (multiple perspectives considered in reasoning). Researchers analyzed mind maps independently and then compared their findings to ensure inter-rater reliability. Neither group of faculties identified Purpose. This implies faculty do not identify developing the WIIFM (what's in it for me) for students. None of the agriculture faculty described Point of View as an element of critical thinking while the leadership education faculty mentioned POV an average of 2.4 times. This implies leadership educators are more acclimatized to multiple perspectives as a part of critical thinking. There were minimal differences in how the two groups mentioned the remaining elements in their critical thinking maps. Faculty in colleges of agriculture show the need for more training on the complexities of infusing critical thinking into their courses.

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A New Model for Open-Source Development of Institution-Specific Textbooks and Laboratory Manuals

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Textbook cost has become a major obstacle to affordable higher education and student academic success. Open textbooks offer a viable solution to rising textbook cost and are growing in use. Both open-access and open-source textbooks typically have one final version. This creates inflexibility for textbook adoption and adaptation and limits instructional creativity – especially for laboratory manuals and instruction. Disciplines like soil science require region-specific laboratory manuals in order to provide hands-on activities relevant to local soils and land uses. We recently published the Soils Laboratory Manual. Our objectives were to 1) cut costs to students, and 2) provide the Soils Laboratory Manual as an open-source manual from which other instructors can develop their own institution-specific editions. The Soils Laboratory Manual was originally developed at North Carolina State University, and later adapted for use in 2015 at Kansas State University where students have since saved a collective \$74,000 relative to the previously used manual. The Soils Laboratory Manual and all ancillary materials have been made available to other instructors through the Open.SoilScience.info library. In five months, 48 instructors from different institutions of higher education have accessed the materials – with several developing their own institution-specific editions. The Soils Laboratory Manual serves as a new model for open-source educational resource development that allows instructors to cater course textbooks and laboratory manuals to their specific course, teaching style, or laboratory facilities.

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Use of 3D Simulation Models to Enhance Student Learning in a Food Science Class

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On an average, 40% of students enrolled in the Fundamentals of Food Science course at Oklahoma State University have limited background in chemistry and biology, as this course is open to non-science majors. We have observed that non-science students have difficulty in understanding the science concepts. The overall goal of the current study was to develop interactive simulation models to enhance student engagement in a food science freshman class. Data were collected during Fall 2017 from the students enrolled in Fundamentals of Food Science (FDSC 1133; 125 students) class. Three different 3D models and three in-class demonstrations related to important concepts taught in FDSC 1133 were assigned to a group of six students (total 21 groups). The effectiveness of 3D models and in-class demonstrations to engage students was assessed using an optional survey given at the end of the semester. The survey was designed to know how effective the simulation models were, the knowledge retained on the concepts, and how well prepared for the exam students were based on a 5-point rubric (1 = disagree, 5 = agree). Approximately 88.4% students (score >4) indicated that 3D simulation and in-class demonstrations were beneficial, helped them to interact with peers, to perform well on assignments, and to better understand the theoretical concepts. Approximately 30% students noted that they are visual learners, hence activities helped them learn better and 40% indicated that this activity-initiated peer-led learning. In summary, the use of appropriate experiential teaching method can enhance learning experience.

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STEM, Project-Based Authenticity: More is Not Always Better

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Researchers have reported that participation in agricultural education reinforces STEM concepts. The use of projects in instruction is common in agricultural education. At the core of this study was an examination of how one of the foundations of agricultural education, project work, can affect the integration of STEM concepts. The use of projects extends into the classroom, outside of the examined SAE context. However, the foundational understanding of certain tenets of this method of instruction is not clear. A quasi-experimental study was conducted to test how real and/or authentic projects need to be to affect learning. Agriculture Food and Natural Resources students were sampled and assigned as a cohort group to one of four treatment groups (N=219). Fourteen cohort groups were identified in five sites. Researchers randomly assigned each of the 14 groups to one of the four project types varying in their design according to the degree of project authenticity when learning about electricity. An ANCOVA was used to test the effects of project authenticity in a pretest posttest quasi-experimental design. Project type varied on authenticity. A test of project type groups yielded statistically significant results with small effect size. Pairwise comparisons revealed no differences between the most and least authentic projects but statistically significant differences between the two projects with medium levels of authenticity and the other two kinds of projects (i.e., least authentic and most authentic). Projects with medium levels of authenticity were also projects that offered most cognitive dissonance to the participants.

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Exploring the Cultural Context of Agricultural Education for Military Veterans

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Initiatives designed to help military veterans enter agriculture continue to gain momentum in the United States. Government agencies, institutions of higher education, and the non-profit sector are responding to this growth by offering new educational programs designed to train veterans with farm business and production skills. While promising, programs focusing on skill building often omit important aspects of developing the whole veteran. Therefore, drawing upon Cultural Capital theory and Symbolic Interactionism, this study explores the ways in which an adult agricultural education program plays a role in transforming veteran's cultural identity as they transition into a civilian community. Using an ethnographic case study, we illustrate the educational experiences of one cohort (n=16) of military veterans participating in a hands-on training program designed for military veterans interested in agriculture as a career. Objectives for this presentation are three-fold. First, we demonstrate how this program used symbolic meanings of self and objects from the military as a key element of their educational design. Next, we explore the participants' experiences of learning in this program and the re-signing of meanings being made as they integrate into an agricultural community. Finally, with a focus on cultural capital and social mobility, we illustrate the importance of using military symbols and meanings to design veteran programs within an agricultural educational context. Implications include understanding holistic and culturally appropriate agricultural education to address veteran inclusion into a civilian society and illustrating an ethnographic framework to study programming for military veterans as an underserved audience.

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Factors Influencing Choice of Major in the College of Agriculture and Life Sciences at Iowa State University

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Agriculture is a fast-growing career field and employers are looking to Universities for graduates to fill the myriad of employment opportunities that are available, therefore recruiting students into Colleges of Agriculture is important to meet the growing job demand. The purpose of this qualitative study was to determine what factors influence a student's decision to major in the field of agriculture at Iowa State University. One focus group and twelve individual interviews were conducted with 22 first year students in the College of Agriculture and Life Sciences (CALs). Participants were asked to identify factors related to three overarching categories: interpersonal, personal and environmental. Major themes that developed in the interpersonal category included love of animals, experience on a farm and aptitude for science. Themes for the personal category included people, 4-H, FFA and participation in youth events held on campus. The environmental category was subdivided into college related and career related. College related themes that emerged included reputation of the program, tuition, people associated with the college and campus aesthetics. Career themes included career fair, vet school, and high placement rates. A new category emerged as a result of the discussions called social factors and this included work-life balance and friend network. Incorporating personal, interpersonal, environmental and social factors into a recruitment plan could potentially help Colleges of Agriculture recruit more students into their programs thus graduating more students that are ready to enter the growing agriculture workforce.

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A Longitudinal Study Examining Student Evaluation Scores and a Faculty Development Program

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Faculty development programs for faculty of agricultural colleges have aimed to improve teaching and learning in undergraduate and graduate courses. This longitudinal study examined a semester-long, faculty development program that was offered annually from 2008 to 2016. The voluntary program sought to enhance novice faculty members' teaching practice by improving their instructional design and delivery. Student instructor evaluation scores recorded as part of normal university-wide instructor and course ratings were compared. A paired samples t-test was used to compare participant's (n=53) student evaluation scores before completion of the program with their student evaluation scores after the program. Results indicated a statistically significant difference between scores, demonstrating slightly higher student evaluation scores after faculty completed the teacher training program. It was also found that faculty (n=51) had higher student evaluation scores for classes that they taught during the semester of program enrollment, compared to classes they taught prior to program enrollment. Lastly, this study compared student evaluation scores for courses before (n=271), during (n=108), and after (n=1,110) faculty members' completion of the program with their department student evaluation averages. Results indicated that before completion of the faculty development program, faculty members had slightly lower student evaluation averages compared to department averages. Student evaluation averages were found to be slightly higher than department averages during and after program completion. Although variations were found between graduate and undergraduate-level courses, this study supports the use of faculty development

programs as a strategy to improve student perception of instructor effectiveness.

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The Effects of Food Waste Education on Student Knowledge, Attitudes, and Plate Waste

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Wasted food makes up the largest percentage of any one material sent to landfills each year in the United States. School cafeterias are major contributors to food waste with plate waste estimates reaching nearly 40%. Despite this growing issue, most U.S. schools do not currently incorporate food waste into their curricula due to time constraints and need for direct alignment with core academic standards. To address these gaps, we developed *The Nature of Food Waste*, a standards-based, multidisciplinary curriculum designed to educate youth about food waste and implement strategies to reduce plate waste in schools. We formally evaluated the efficacy of educational interventions at two grade levels (2nd and 5th) in two Indiana schools. Each school consisted of a treatment (educational intervention) and control classroom (no educational intervention) for each grade level. We conducted pre/post-surveys of all participating students (N=115), and pre/post-interviews of select students (N=37) to evaluate the effects the education had on student perceived knowledge and attitudes. We also weighed the food waste of all participants to measure the effects of the education on student plate waste. Results showed that knowledge and attitude responses to the education varied between schools, grade levels and across classrooms, but that nearly all classrooms reduced their plate waste, with reductions in food waste ranging from 3-58%. Overall, we would recommend that K-5 schools across the U.S. implement this education as an effective means for reducing student plate waste.

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Students' Views of Employability Skills Gained from Short-Term High Impact Experiences

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High impact experiences (HIE) such as short-term study abroad programs provide benefits to participants that might help them in future employment. Participants in short-term HIEs have self-reported higher levels of benefits in communications, interpersonal and teamwork skills, increased motivation, and analytical skills. Research suggests participants increased their probability of employment after graduation by 23% because of their HIE. Additionally, participation in short-term HIEs improved students' understanding of intercultural knowledge and global competencies in society and business. The purpose of this study was to describe students' self-perceived value (e.g., in future business or social settings) of experiences gained from short-term study abroad programs at Texas A&M University. Sixty-two students representing four programs during 2017-2018 provided input to the scenario: "Your recent HIE learning experience sets you apart from all other future job seekers. Think about your 30-second sales pitch to a future employer when asked in a job interview, what makes your HIE experience valuable to this company or society?" Content analysis of the data revealed students perceived their HIE provided them with opportunities to improve their non-verbal communication skills, interpersonal and teamwork skills, and understanding of global cultures. Students believed short-term HIEs were valuable for future employment because they considered problems with different cultural perspectives after the HIE. Educators should require students to develop daily reflective journals to document perceived changes in their employability skills throughout HIEs. Future research of HIE impact on students' employability skills should include differences of career competencies before and after the HIE.

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Students' Self-Perceived Teamwork Skills Growth from Study Abroad

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Research shows students participating in study abroad programs increase their teamwork skills. Teamwork is the ability to work with others, inspire confidence, articulate common goals, participate actively, create a comfortable environment, and adapt to change. Purposeful reflection sessions can help students achieve greater understanding of how to apply their teamwork skills in non-academic settings. The purpose of this research was to describe students' self-perceived teamwork skills from short-term study abroad experiences. Students' were asked to complete pre- and post-travel reflection logs to help them understand their self-perceived teamwork skills. The data were derived from students' (n=55) perceptions of teamwork skills at Texas A&M University after having participated in agricultural-oriented study abroad programs in Costa Rica during 2017-2018. Content analyses of pre-travel results showed students' teamwork beliefs were related to confidence, collaboration, and adaptability. Following their study abroad experiences, students referenced confidence, collaboration, and contribution as most important to teamwork settings. Confidence and collaboration were consistent themes before and after study abroad, however adaptability, more evident in pre-travel perceptions, was replaced by contribution as the critical teamwork theme identified in post-travel perceptions. This shift in perception from adaptability to contribution may be a key indicator that students' views of teamwork progressed. That is, pre-program, students fixated on how to adapt to a team. Post-program, adaptation was not a concern because they realized their true value was contribution to teams. College of agricultural educators can help students transition from adaptation to contribution in teamwork during study abroad programs.

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Framework for Thinking Critically About Science in the Media

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To appreciate the full value of science, citizens need critical thinking skills to enable engagement with the scientific method and its output. Science skepticism is rampant, and on many important scientific issues public opinion is at odds with scientific opinion (e.g., the threat of climate change, the safety of modern agriculture). We have developed a framework and case studies for developing critical thinking skills in the K-12 and post-secondary classrooms. The materials can also be used by industry and non-profit groups to encourage critical thinking among their audiences. The framework is grounded in a review of academic research in cognitive and educational psychology. It emphasizes three dimensions of critical thinking: 1) Diligent clarification to make sure that claims of fact are unambiguous and comprehensive. 2) Slow thinking to allow for appropriate inferences based on logic and probability, and to avoid jumping to conclusions based on emotional reactions. 3) Humble self-reflection to ensure a distinction between what is known and what is not known, and to express uncertainty honestly and consistently. The framework can be applied to any media object or public discourse, but we have developed case studies of media dealing with the science of the food industry (including nutritional science, agriculture, food processing, bioethics, etc.). Examples include the films *What the Health* and *Food Inc.* both of which demonstrate numerous violations of critical thinking standards by, for example cherry picking scientific findings, misrepresenting scientific findings, failing to recognize a need for tradeoffs, overconfidence in claims, and knowledge illusion.

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Development of a 3-Day Animal Science Mini-Internship Program

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The University of Alberta recently implemented a November “reading week” break to match a long-standing February reading week break. This additional week without scheduled classes and laboratories was approved by the university with the intent that academic programming would be scheduled during this week to assist students in their programs of study. In 2016 a program was developed to provide students in Animal Science and Animal Health programs with the opportunity to volunteer to work on private farms, the University of Alberta Research Station or large animal/poultry veterinary clinics. The objective of the program was to enable students to gain initial experience so that they could have the experience and confidence to seek longer term employment in animal science. The 3-day program has been offered three times in Fall 2016 (15 students), Winter 2016 (22 students) and Fall 2017(50 students). Students must apply to the program, pay a modest administration fee and are interviewed to assess maturity, background knowledge and to find out their specific commodity interests. Students are then placed in groups of 2-4 and are expected to work 24 hours. An orientation session is provided to help prepare students for what to expect. Students either commute daily or are billeted on work sites. A wind-up session is held after the internship to debrief student experiences and to obtain suggestions for improving the program. Student and host site satisfaction with the program has been very high with over 70% of the students returning for another placement.

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Active Learning Strategies Impact Curiosity in an Introductory Animal Science Course

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Research suggests a link between active, intrinsically-motivated learning and subject-specific curiosity that might be leveraged by teachers to support academic performance. This study investigates relationships between self-reported curiosity in animal science and the perceived impact of seven learning activities. A questionnaire was administered to 238 students in an introduction to animal science course (93.2% response rate; n = 222). Likert-scale questions prompted students to rate pre- and post-course levels of curiosity in animal sciences, and to rate the impact of each of the following learning activities on their interest in studying animal science: case studies, think-pair-share, exam review sessions, laboratory stations, laboratory handouts, iClicker questions, and laboratory critical reflections. Most of the students indicated their pre- and post-course levels of curiosity in animal sciences as very high or extreme (67.1% and 65.3%, respectively). Paired t-tests indicated no change in curiosity in animal sciences over the course of the semester. Pearson correlation coefficients showed a strong positive relationship between end-of-semester curiosity level and the perceived impact of each of the learning activities on interest. Of the learning activities, case studies and laboratory stations were most strongly related to end-of-semester curiosity ($r=0.373$, 0.377). These results indicate that active learning strategies stimulated more interest in students with higher levels of curiosity in animal sciences and suggest that interactive, group-based instructional methods like case studies and laboratory stations are beneficial for this group of students.

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Exploring Factors to Help Recruit and Retain Underrepresented Minority Students

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Many institutions today seek ways to ensure all students, regardless of their ethnicity, background, or socioeconomic status, achieve success in college. The College of Agricultural Sciences at Oregon State University has joined this effort by engaging in initiatives and research to recruit and retain underrepresented students. To accomplish this, our research objective was to identify variables that influence undergraduate students' sense of belonging, satisfaction with the college environment, and likelihood to drop out. We collected data by designing and administering a questionnaire that was emailed to all undergraduate students in the spring of 2017. Survey data from 248 students were collected and analyzed. Findings indicate both underrepresented (URM) and non-underrepresented (Non-URM) students have generally positive perceptions of the college environment. However, URM students felt significantly less comfortable with the college environment compared to their Non-URM peers, specifically in regard to how URM students are valued and welcomed into the college. Findings also indicate overall satisfaction of the college environment was a significant positive predictor of sense of belonging, along with supportive friends and family members. Interestingly, neither having a faculty mentor nor URM status predicted sense of belonging. Additionally, neither URM nor Non-URM students were considering dropping out of school, and no statistical difference in dropout likelihood between URM and Non-URM students was found. Finally, supportive friends, supportive family, and satisfaction with the college environment were significant negative predictors of dropout. Our discussion will further explore these results as they relate to improving recruitment and retention of URM students.

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Perceptions of Learning in Food and Agricultural Chemistry

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Food and Agricultural Chemistry was developed and is taught at Missouri State University to provide organic and biochemistry concepts to agriculture majors. Student-faculty interactions suggest students are apprehensive about the course and recent observations by the course instructor suggest students have a defeatist attitude regarding the class. Therefore, during fall semester 2016 (n=52) and 2017 (n=46) a questionnaire based on the Intrinsic Motivation Inventory (IMI) was provided to class participants (n=during the first and last week of the class). The survey included questions related to students' interest and enjoyment, perceived competence, effort and importance, pressure and tension, and value and usefulness, as well as confidence in technical and interpersonal skills. Demographic information, including prior completion of science and math courses, was also collected. In addition, a test was administered to estimate learning of key organic chemistry concepts. Pre-and post-test results of both the survey and test were compared using paired t-tests to assess the impact of the course on intrinsic motivation, mastery of organic chemistry, and confidence in technical and interpersonal skills. Chi-square analysis was used to assess relationships between IMI responses and student demographics. Students perception of importance and competence increased over the course of the semester. Student post-test scores increased 6.1+0.8 points ($p < 0.0001$). Increased perceived usefulness was associated with increased post-test scores ($p = 0.0383$). An understanding of student demographics, prior STEM courses, and perceptions of chemistry, should facilitate student learning.

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Beekeeper Education and Support in NW Iowa

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Two grants supported adult beginning beekeeper development in the four-state region of Iowa, Minnesota, South Dakota, and Nebraska with the objective to meet an identified educational need of new beekeepers (newbies) in the region. People in the region used a variety of information to start beekeeping, but there was a lack of solid training, continued technical support, and many beekeepers failed in their management of bees. Frustration, disappointment, disillusionment, and financial loss occurred. A grant from the North Central Region Sustainable Agriculture Research and Education in 2016 and a grant from the Leopold Center for Sustainable Agriculture in 2017 supported a focused approach of initially educating adult beginning beekeepers that required anyone taking the course to commit to beekeeping, and they paid a \$70 registration for four two-hour evening classes. Technical support from two hired technicians provided follow-up and continued education. Two field days implemented classroom activities in the morning and hands-on field activities in the afternoon. The activity resulted in an 85% success rate of 88 out of 104 participants successfully keeping bees. The participants formed a local beekeeping club that meets monthly with 30-60 participants in attendance. Outcomes of the work included the delivery of a revamped course that reached over 100 people. The people formed a local beekeeping association that meets monthly with 30-60 participants that promotes continued education in beekeeping and pollinator habitat promotion.

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Updating Agricultural Communications Curriculum: A Delphi Study

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Think agricultural communications is new? Think again. Early agricultural journalism is now more than a century old, but growth and expansion continue to modern day agricultural communications. Because of changing media habits and advanced technology, changes need to occur in undergraduate curriculum in agricultural communications. Human capital theory suggests humans are valued based on their knowledge, education, experience, and skills. What specifically adds value to agricultural communications students? What curriculum should new and developing programs include to prepare career-ready graduates? Using the 1994 Terry, Lockaby, and Bailey-Evans competencies as a guide, researchers at Oklahoma State University asked mostly Midwestern U.S. agricultural-industry professionals — those who hire and fire — what knowledge, education, experience, and skills graduates need. Through a three-round, online modified Delphi study in fall 2017, a 14-member panel reached the agreement threshold (which was defined as a 75% agreement) on 109 competencies in nine categories: computer skills (13 competencies), written communication (16 competencies), mass communications law (3 competencies), photography (6 competencies), public relations and marketing (12 competencies), oral communications (8 competencies), new media (8 competencies), career-readiness skills (33 competencies), and other necessary skills (10 competencies). Of these, 64 competencies address new or advanced curriculum needs. Although the other 45 competencies were included in earlier research, these competencies took a new form in 2018. These results cannot be generalized to all agricultural communications jobs; however, university educators can use this study to guide an evaluation of their current curriculum.

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Assessment of Critical Thinking Skills in an Animal Science Curriculum

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Because of animal production industry's desire for college graduates with critical thinking skills, university faculty are evaluating curricula to ensure students are given opportunities to develop and grow critical thinking skills. The purpose of this study was to explore differences in critical thinking skills between freshman and senior animal science students. This study had three objectives: 1) compare freshman and senior animal science students to national critical thinking skill norms; 2) determine if there is a difference between freshman and senior animal science students in critical thinking skills; and 3) determine if there is a difference in critical thinking skills based upon selected demographic variables. A group of freshmen ($n=55$, males $n=17$, females $n=38$) and seniors ($n=60$, males $n=13$, females $n=47$) in the Department of Animal Science were randomly selected to take the Critical Thinking Assessment Test during the Fall 2016 semester. The results were compared with national norm scores and select demographics. Freshmen scored better than the national norm for freshmen ($p<0.05$), while seniors scored lower than the national norm for seniors ($p<0.05$). When comparing the two groups, seniors scored significantly higher ($p<0.05$) than freshmen. Results showed no significant difference ($p<0.05$) between genders; however, there was a difference with senior-females scoring higher than the freshmen-males. This study provided the Department of Animal Science with an understanding of the levels of critical thinking skills for each class level, as well as differences between the two classes to potentially increase the critical thinking teaching opportunities within the curricula.

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Promoting Student Learning of Statistical Food Sampling Plans Using a Visual Novel

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Although student learning is enhanced by experiential learning in real-world scenarios, students are not often exposed to these settings because of obstacles such as time and financial constraints. The recent emergence of instructional technologies such as virtual reality and 360-degree photography has opened possibilities for instructors to overcome these hurdles by providing similar experiences in virtual environments. Therefore, the objectives of this study were to (1) develop a problem-based e-learning module that engages higher-education students with real world applications of statistical sampling plans in the food industry through a visual novel featuring 360-degree still images; and (2) evaluate the effects of the module on student engagement, learning gains, and self-efficacy. The process in which a design document was developed and converted into a Smart Sparrow e-learning module will be discussed. The results from implementation of an evaluation instrument for measuring students' engagement, knowledge, and self-efficacy development at three different universities, will also be presented. Recommendations for future applications and research studies will be developed based on these results.

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Undergraduates' Perceived Personal and Social Responsibilities of Global Citizenship

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Global citizenship requires personal and collective thought and action. The AAC&U established the Global Learning Value rubric, which includes a personal and social responsibilities component; learners take informed and responsible action to address ethical, social, and environmental challenges globally and evaluate the consequences of individual and collective interventions. Research shows that after study abroad, students were confident and committed to having a global point-of-view. What are students self-perceived personal and social responsibilities after agricultural-oriented, short-term, study abroad experiences? The purpose of this research was to describe Texas A&M University students' perceptions of personal and social responsibilities after participating in one of three agricultural study abroad programs during 2017-2018. More than 60 students completed the statement, "Concerning what I learned about my host country people and myself, the next time I travel to a new country, I will..." Content analyses showed students realized a greater responsibility to learn about host countries' cultures and traditions before arrival. Students perceived personal responsibilities were to embrace mannerisms and behavioral differences in social settings in foreign countries. Their self-perceived social responsibilities included gaining deeper understanding of the host country's economics, government, and environment. Overall, results showed students had improved understanding of their responsibilities as global citizens after participating in agricultural-oriented, short-term, study abroad programs. Agricultural educators conducting study abroad programs can prepare students by including multicultural perspectives and global citizenship activities in their lessons. Future research on this topic

should explore the personal and social responsibilities component more deeply to increase understanding of global citizenship.

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Influenced Decisions: Study Abroad Effects on Students' Decision-Making Skills

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Many variables influence our decision-making processes. Researchers of business ethics found that nationality, religion, sex, age, education, employment, and personality influence our decision-making; situational variables such as referent groups, rewards and sanctions, codes of conduct, and ethics also influence them. A change of environment can strongly influence decision-making. All such variables are present in study abroad programs, begging the question: Does study abroad alter students' perceptions of their decision-making skills? The purpose of this research was to describe Texas A&M University students' self-perceived changes in decision-making skills after participating in agricultural-oriented, short-term, study abroad programs during 2017-2018. Data were collected from Texas A&M University students' (N=76) pre- and post-reflections of decision-making skills in two study abroad programs (Costa Rica and Namibia). Pre-travel results showed students described themselves as very confident in their decision-making skills. For example, decision-making skills were described as being steady (i.e., logical). They claimed to consider codes of conduct, rewards, and sanctions before making decisions. Students' post-travel reflections showed they viewed decision-making differently. They considered others' cultural perspectives when making decisions. After study abroad, many students claimed to have a broader view of causes and effects on their decision-making processes. Study abroad program leaders can help students increase understanding by discussing cultural differences on decision-making processes before travel. Educators can use this

information to prepare study abroad materials that help students understand how foreign locations and cultures affect their decision-making skills. Future research is needed to analyze differences in students' decision-making skills depending on study abroad location.

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The Effects of Participation in Undergraduate Research on Soft Skills and Career Plans

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Undergraduate Research, a unique form of experiential learning, allows students to participate in conducting research, analyzing data, and presenting results. Our objective was to determine how involvement in undergraduate research enhances common soft skills and affects future career plans. A mixed survey was deployed by email to 25 participants, ranging from 18 to 36 years of age and from urban, suburban, and rural areas. Participants were currently or had previously completed undergraduate research through 9 agriculture departments at 8 different universities. Survey questions sought to determine the change in skill set development and perception of research due to participation in undergraduate research. Participants reported an increase in an interest in conducting research, making a career in research, and wanting to achieve higher education. Respondents stated that they had improved time management skills, a greater ability to prioritize tasks, and improved independent thinking. Skills such as oral communication, written communication, listening, thinking strategically, and asking relevant questions were enhanced after research participation. Participants (72 %) stated that involvement in undergraduate research contributed to a change of career plans, while 100 % stated that they benefitted from their time in undergraduate research. Overall, participants felt involvement in undergraduate research had a strong positive effect on their development of ethics, relationships with professionals, faculty and peers, and networking opportunities.

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The Benefits of Living in an Agricultural Residential College

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The success of students who lived in an Agriculture-based residential college (ARC) in their first year at a public land grant university has been studied. The purpose of the study is to investigate the longer-term perceived benefits. Graduating seniors who remained in a major housed in the College of Agriculture (CoA) were contacted by email about participating in a focus group interview in April 2017. Eleven students were interviewed, in three groups by a member of the residential college staff unbeknownst to them. The faculty director of the University's Residential College program sat in as an observer and note taker. The interview questions inquired about their experiences in college, specifically those that stemmed from their ARC participation. The interviews were transcribed verbatim and supplemented by the previously-described notes. Researchers analyzed the data for salient themes using a qualitative approach. Most of the participants were female and most were majoring in a field related to animals. These characteristics reflect both the gender composition and majors of students, primarily pre-veterinary medicine, who live/lived in ARC as well as the CoA as a whole. Of the students who reported changing their degree programs, most changed from a Pre-Veterinary Medicine to a Wildlife-related one and expressed enthusiasm for the change. They advised freshmen to not to get 'upset' about changing majors. Most of the students indicated that one of the primary benefits of their ARC experience was enhanced connections with faculty and peers, and that these relationships continued well beyond the first-year experience.

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Enabling Access to Nontraditional Destinations: Including Students with Disabilities on Faculty-Led Study Abroad Programs

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Study abroad, service learning, and community engagement programs abroad have been well-documented as impactful learning and career preparation experiences. Students with disabilities, however, are often excluded from non-traditional destinations, for example African countries, and deep community engagement involving service learning and cross-cultural collaborations. Faculty at a mid-western university highly ranked for accommodating students with disabilities and empowering those who use wheelchairs developed an inclusive three-week faculty-led service program to Cape Town, South Africa. Prior to accepting applications for the program, resources for planning inclusive experiences abroad were collected, physical environments of community spaces to be utilized on the trip were visited and critiqued, campus support agencies for inclusive program support were consulted, and a support team at the destination abroad was assembled. Outcomes from five years' experience with an inclusive faculty-led service program has led to development of guidelines for trip leaders, a list of online resources for planning inclusive programs abroad, a disability pre-departure checklist for students taking a personal assistant for trip support, and a checklist of student responsibilities while abroad. Post-trip student participant reflections emphasize the success and empowerment of inclusive programs with cultural, community, and collaborative learning experiences in non-traditional destinations. Resources will be offered to encourage college faculty and study abroad personnel to increase the opportunities for students with disabilities to participate in experiential learning programs abroad.

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Media Products as End-of-Unit Assessments

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When students have the opportunity to enact professional experiences, they make more substantial meaning than merely analyzing scenarios. This, known as the approximation of practice, lends to solidifying a learning experience into more meaningful future action. In an undergraduate Agricultural Safety and Health course students were instructed in general agricultural machinery safety, and then given an end-of-unit assessment which approximated practice in the form of a video performance of machine safety training. Parameters were set, including minimum and maximum length of video, submission file type, and sample scenarios for development. Instructional objectives were established, but creative freedom was given to the student. Videos enabled students to express the major themes of the unit, were easier and more entertaining to score, and provided a creative output for students to practice what they had learned in a role reflective of meaningful safety personalities (i.e. television show hosts, personally connected videos that could be handed over to an agricultural company they were connected with). Qualitative feedback from students indicated appreciation for a unique assessment rather than a written exam, and enjoyment from the hands-on practice of using the machinery. The assignment also presented challenges. Students commented on the uncertainty of seeing and hearing themselves on video, as well as saving and uploading the video in the correct format to the online learning system used to capture course materials. Future plans would be to include a more robust rubric to guide student submissions, approved sample videos, and increasing accountability through more mild submission alternatives.

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How Flipped Should a Classroom Be? Flipped-Classroom Pedagogy Impact on Student Learning

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The Flipped Classroom model is a current trend being discussed to increase student engagement and, as a consequence, student learning within a course. A common dilemma faced by those considering a change in their course pedagogy to encompass this model is how much should they flip? A week? A month? The whole semester? To answer this, three existing courses taught by the same professor (three each semester) were modified with one of three levels of flipped pedagogy for the whole semester: none, partial, completely. This process was then repeated a second semester. Student evaluation data was collected and analyzed for each course from the previous iteration before the modification; and at the end of each semester for “quality teacher” and “quality course” from the student course evaluations administered through the IDEA form. Courses with the “none” level of flipped pedagogy showed no statistical improvement in either the “quality teacher” or “quality course.” Courses with the “completely” level of flipped pedagogy showed no statistical improvement in “quality teacher,” and minimal improvement, that was not statistically significant, in “quality course.” Courses with the “partial” level of flipped pedagogy showed no statistical gain in “quality teacher” and statistically significant improvement in “quality course.” These results suggest that a partially flipped approach to course pedagogy, while more challenging to manage from the professor’s role, creates a perception of higher course quality from the student’s experience.

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Engaging Undergraduates in Citizen Science with Pollinators to Enhance Conservation Knowledge, Biological Systems Thinking, and Community Engagement

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In this presentation, we report on a course redesign project that engages undergraduate students in introductory entomology and biology classes at three universities in semester-long citizen science experiences with bumble bees. The purpose of this course redesign is to help students to improve their science literacy, systems thinking, and community engagement through authentic citizen science projects in conjunction with more traditional course teaching approaches (e.g. lecture, book readings, and class activities). We will share the results of this course redesign on the impact of the course redesign on student's pollination systems thinking and conservation knowledge will be shared. Conversations from student focus groups on the dynamics of student engagement in science and in their interactions with their communities will also be shared. This presentation concludes with a summary of the impact of this redesign approach (in the context of each location and course) towards addressing the need for students to connect the science content and processes that they are learning to a larger system (their community).

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Understanding (Dis)Engagement by Disrupting & Reversing the Experiential Learning Sequence

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Educators and students struggle with engagement in many educational settings. A lack of engagement has contributed to an ever-widening gap between how students develop knowledge, skills, and abilities and how teachers provide instruction. The purpose of this study was to understand how depth and sequence of experience influenced student engagement. During one calendar year, 42 undergraduates enrolled in social science research methods course and agreed to participate in one of two cohorts with two sequences of experience (moving from shallow to deep or the reverse). Data were collected from interviews, observations, journals, and dialogue. Resulting themes described complex and unforeseen realities of (dis)engagement experienced by teachers and students. Conclusions included the profound effect physical learning environment played on students' interest and motivation in learning. Although the reverse sequence (deep to shallow) proved to be more engaging, a students' personality was most indicative of whether they viewed the experience as disruptive or destructive. Student (dis)engagement was most notably affected by an individuals' temporal, physical, and emotional proximity to specific experiences. For some, disruption was fun and challenging, for others, it was destructive, paralyzing, and defeating. At the conclusion, it was evident that the influence of experiential depth and sequence could not be clearly understood without taking into account the different rates at which students reflect upon and unpack new learning experiences.

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Student Subjective Opinions of Great Teachers – A Q-Methodology Study

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Educators play four important roles when facilitating learning experiences. These experiences range from college lectures to internships. Research has provided strong evidence that the best predictor of educational outcomes is the instructor, but the majority of that research focuses on secondary education. What are students' perceptions of "great teachers" and how does that change based on their transition from high school to college? The purpose of this Q-methodology study was to understand the perceptions of rural first-year undergraduate students regarding characteristics of great educators. Forty-five participants sorted 36 cards that presented opinions consistent with Kolb's Educator Role Profile framework. Students were prompted to describe their "best high-school teacher" and their "best college professor." Three perspectives arose following a principal components analysis and VARIMAX rotation. First, 24 students perceived that their greatest educator valued them as an individual and sought to build a personal relationship with them. The second perspective, held by twenty-six students, indicated that students believed their greatest educator was rigorous and structured in the classroom. The third perspective was holistic in nature, balancing multiple educator characteristics and was aligned with 14 students. Reviewing the three perspectives highlighted that students viewed their best high school educators as caring, while their best college professors were rigorous. Of most interest, is the third perspective where students begin to identify that college professors that are rigorous and seek to understanding the value of their course to students are appreciated and valuable. Specific skills are identified as most important in student opinion development.

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Assessing the Science Literacy in Agriculture of Secondary Agricultural Education Students in Oklahoma – An Exploratory Study

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In his recent text, *How to Think*, Alan Jacobs described the state of thinking in America as "depressing." As the principal investigator for a series of studies sponsored by the National Science Foundation, Miller argued that a scientifically literate citizen must have, (1) a basic vocabulary of scientific terms and constructs; and (2) a general understanding of the nature of scientific inquiry?". It has been purported that only 17 percent of citizens are science literate. This descriptive study explored the science literacy of secondary agricultural education students in the context of Genetically Modified Organisms (GMO). Forty-nine students from Oklahoma were asked of their opinion of GMO products and were then asked to provide a description of how genetic modification occurred. The interviews were recorded and then observed in order to determine students' knowledge, comprehension, and application of the science of GMO. Thirty students shared they would eat a GMO, but only four provided sound theories to defend their decision. Students understood the basic terms related to GMO but could not understand or apply the concepts of DNA and protein synthesis. These results are alarming when compared to research indicating that agriculture, as the context for science, leads to critical thinking and depth of understanding. It was recommended that teachers of both science and agriculture focus more on the application of key concepts to develop critical thinking and science literacy. Colleges of agriculture face challenges in remediating this lack of science understanding in the context of agriculture.

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Successful Adventures: Agricultural Living-Learning Community Best Practices

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Freshman retention is one of the most critical goals for post-secondary academic programs. National retention rates indicate that one third of first-time freshman will not return after their first year. College-life readiness goes beyond academic preparedness. First-time freshmen are expected to make financial decisions, manage time effectively, and balance studies with positive social development. These overwhelming decisions often cost the student time and other resources, which lead them to consider withdrawing from the university rather than persisting to graduation. Studies suggest that freshman retention increases when academics and on-campus residential experiences are combined with interaction with peers, mentors, and faculty who share similar academic interests. Specifically, freshman pursuing degrees in agriculture often prefer a field-dependent learning style and are more driven and receptive to social reinforcement. Living-Learning Communities (LLC) provide first-time freshmen the opportunity to focus on preparing for a successful college experience through study groups, enrollment in corresponding classes with their cohorts, and networking with peers. Researchers have outlined best practices for developing and implementing an agriculture-based LLC. Previous studies verify that retention will increase if students are exposed to academic and social engagement, participate in first-year experience courses (FYE), and partake in service-learning projects. Orientation and academic advising should be incorporated in to the LLC as a means of interaction. FYE courses should include career planning, campus resources and involvement, and personal development. Service-learn-

ing should be incorporated to enhance student involvement which promotes not only academic success but also personal growth.

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True Grit: Describing the Grit Score of Students in an Introductory Agriculture Course

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Student retention in college and in a career is largely a function of the personal factors related to resilience. One of the most recent factors to be recommended in the examination of resilience is the concept of grit. According to Duckworth, grit is a measurement of passion and persistence toward a long-term goal. Helping students know their grit scores may be a way to increase students' ability to persist through difficult classes, in difficult majors, and in higher education in general. The concept of grit has not been fully examined in higher education students, let alone students within colleges of agriculture. Our intent with this study was to provide baseline data for grit in students within an introductory course. We used Duckworth's grit scale to examine grit in a freshman-level Agricultural Education course. Findings revealed student average grit score was lower than average ($M=3.72(sd\ 0.53)$). Scores for the grit constructs were: $M=4.05(sd\ 0.66)$ for passion and $M=3.44(sd\ 0.70)$ for perseverance, on a five-point scale. Males in this study had self-reported grit scores of $M=3.53(sd\ 0.56)$, while female grit scores were $M=3.83(sd\ 0.51)$. By understanding student grit, we can develop a plan for increasing this personal factor, which may have an influence on student retention. The results of this study have prompted us to develop activities specifically designed to enhance the grit of our students and have highlighted the importance of grit in our assignments, activities and programming.

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Using Speed Rounds to Balance Classroom Debate Participation across Personality Types

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This paper recommends classroom debates for use in an upper-level agricultural policy course in the undergraduate classroom. In many debates, only two to six students actively participate in the debate and this can contribute to a listless debate environment for most students. Inserting a speed round increases debate participation beyond a handful of students and can be inserted either between traditional debate rounds or after the traditional debate has concluded. During a speed round, students are given either a predetermined time (such as 20 seconds) or a predetermined sentence limit (such as 1 sentence) to respond to the opposing team. I distributed an IRB-approved survey to 50 students in a 400-level U.S. Agricultural policy course both before and after the debate that assessed their pre-debate anxiety, the likelihood that they would speak in the debate, the number of times they spoke during the debate, knowledge acquisition, and personality characteristics. The questions on personality characteristics allowed me to categorize the students as either introverts, extroverts, or ambiverts. I also analyzed exam performance on debate topics. Initial key findings suggest that the speed round encouraged introverts to voluntarily participate in the debate even though they rated themselves significantly less likely to participate in the pre-debate survey. Students self-reported knowledge gains across personality groups. Additionally, students performed better on exam questions relating to the debate topics as opposed to topics that were not discussed in a debate format.

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Rolling the Academic Integrity Dice on Group Activities: Cheating or Collaboration

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Instruction in colleges of agriculture and natural resources often include group activities. Faculty value group activities to promote teamwork, a soft skill desired by the industry as one of the most valued skills among college graduates. These activities involve students working together on laboratory assignments, reports, papers or presentations resulting in a final product produced by multiple students. However, unless the professor specifies otherwise, academic integrity policy states all work submitted for a grade will be the product of the student's work. When a student's work is identical or very similar, it is reasonable for the professor to conclude academic misconduct has occurred. At the University of Arkansas, students reported for academic dishonesty for facilitating or aiding others or collaborating accounted for 39.2% of the cases in 2017. In a survey of 326 university faculty, 52.9% felt the academic integrity policy and the process should largely be educational as opposed to punitive but perceived only 52.0% of students were familiar with the policy on sharing homework and 51.3% on collaborating on assignments. Additionally, 39.8% believed it was the primary responsibility of the faculty to educate students about academic integrity, 72.9% indicated it was the responsibility of the student, and 43.1% thought it was the responsibility of the administration. Confusion exists on group work and who should educate students on the academic integrity policy. Therefore, faculty should review the team assignments in use, discuss the academic policy in class, and receive training in the effective design and management of team assignments.

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Seeds for the Future: Workplace Readiness Skills for Tomorrow’s Agricultural Workforce

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With job openings in the agricultural industry recently showing record growth, it is important for America’s young agriculturists to be adequately prepared for their future careers. While technical knowledge is an important component of workforce readiness, behavior-based skills such as communication and adaptability are becoming increasingly sought after. Unfortunately, research shows that many students do not value these skills to the same degree as their future employers. The purpose of this study was to describe the differences in these expectations between students and employers in the agricultural industry. Students were presented with a list of 54 job skills that included competencies such as “present information verbally,” “handle conflict maturely” and “work to achieve organizational goals.” From this list, they were asked to identify and rank the 10 skills they viewed as most important to workplace success. In order to identify the work skills sought by agricultural employers, we analyzed 43 entry-level announcements for a wide variety of careers in the agricultural industry. Skills were grouped by themes such as “communication,” “flexibility and adaptability” and “time management and organization.” Importance rankings showed that students placed the most value on building relationships, maintaining workplace harmony, and demonstrating maturity and self-discipline. The job announcement analysis indicated that although employers valued many of the same skills as students, by far the most in-demand were communication skills. Outcomes indicate that agriculture educators must continue to emphasize and facilitate the learning of behavior-based workplace skills in order to ensure students are prepared for their future careers.

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Building a Community of Learners: Strategies to Enhance Student Engagement and Learning

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Student engagement in the classroom is critical for achieving learning outcomes. The objective of this presentation is to share simple learner-centered strategies for enhancing student engagement and opportunities for thinking. We have evaluated the use of turn to your partner questions (TTYP) and final summary points as learning enhancement strategies. Turn to your partner questions are used during each class period to give students an opportunity to become involved in their own learning process. The TTYP exercise allows students three opportunities to review the material: 1) individually when preparing a response, 2) when comparing and contrasting their responses with a partner, 3) at the end of the exercise when students are held accountable by being randomly called on to share their answers. We have previously determined that increasing the number of TTYP questions from 0 to 2 in a 50-minute class period increases student retention of difficult material. We have also adapted this simple strategy to bring closure to the learning time by including a summary point exercise at the end of each class period using a TTYP format designed to allow students the opportunity to reflect on the day’s material. Student engagement is encouraged as summary points are designed to be used as study tools for exams. Students are again held accountable by being randomly called on to share their summary points with the class. Adaptation of these strategies into a senior level animal nutrition course has positively influenced both student mastery of concepts and instructor evaluations.

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If You Bring Them, Will They Come? The Faculty Role in On-Campus High School Events

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Increasing recruitment into colleges of agriculture is a large priority for institutions of all size. One of the most widely accepted methods for recruiting strong college of agriculture students is marketing to high school students involved in agricultural organizations, like 4-H and FFA. Often, recruitment efforts include hosting secondary student events on campus. This descriptive survey was administered to all high school students attending the Idaho FFA State Career Development Events on the University of Idaho Moscow campus (N=552). Of the n=489 (88.6%) students who responded, 77.2% indicated they will definitely and 19.6% shared they will probably continue their education after high school. The vast majority (72.8%) of students indicated an intent to pursue agriculture as a career, and 51.2% reported that they were likely to attend the University of Idaho. Targeted recruitment during the event was conducted and students rated their overall experience score $M=8.30(sd\ 1.46)$ on a 10-point scale. Based on the results of this study, we recommend continued hosting of FFA events and recruitment targeted to potential agriculture majors at these events. Student open-ended responses highlighted an interest in degree planning and financial preparation as workshop topics during the event. In addition, students revealed a desire for increased contact with faculty members. The results have prompted us to increase the number of college-based workshops and to host a social designed to connect students with faculty members across the college at this year's event.

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A Survey of Introductory Soil Science Courses in the United States

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A survey of introductory soil science (or equivalent) instructors at 76 institutions (36 Land Grant, 40 Non-Land Grant) was conducted to collect information about the current state of introductory soil science course offerings in the United States. Data collected from this survey included information on course content, pedagogies, instructor credentials, and student demographics. Our data demonstrates little evidence for curricular differences between land grant and non-land grant institutions. However, non-land grant institutions have a higher proportion of students taking introductory soil science courses as an elective. A "depth" ranking of topical components of these courses showed that soil water concepts and soil classification were allotted the most time, on average. Pedagogical styles were diverse, with a significant proportion of course time dedicated to active learning, flipped classroom, or online learning formats. There was no significant relationship between class size or institution type and the proportion of the non-lab component of the course taught in alternative formats. Over 40% of respondents expressed interest in connecting with other introductory soils instructors to share course materials and explore new approaches. The results of this survey will serve as a resource to 1) improve general knowledge of the diversity of materials, methods and pedagogies utilized to teach introductory soil science courses in the U.S., 2) assist instructors or institutions in the process of revising or reviewing their introductory soil science courses, and 3) identify opportunities for cross-institutional cooperation or development of course materials and resources.

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Growing Students' Mindset: A Lesson to Analyze Perceptions About Organic Food

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For the past four years, one 3-hour session of the senior Agronomy Capstone class at Kansas State University has focused on organic food. Lesson objectives are to make students aware of the availability and cost of organic food in the community, analyze scientific and public opinion about organic versus conventional production, and compare taste and quality for selected organic versus conventionally grown foods. With a 20-item grocery list, students go to two stores trying to find organic and conventional versions and record per unit prices for comparison. In class, discussion follows on ease of access and cost differences. Students consistently report finding organic sources was more challenging than they expected and that price differences are quite variable depending on the product. Instructors provide 10-15 products labelled A versus B. Students rate the contrast for preferred taste and guess which is the organic version. Over four years, 86 students have rated the organic version clearly preferred for 14% of the items and the conventional version clearly preferred for 37%. For 49% of items, there was no distinct preference. The class has clearly identified the organic version only 52% of the time. Students recognized considerable bias based on flavor differences (ie. saltier, sweeter) among the paired products. After the tasting, a documentary movie is shown (ie. Food, Inc., Food Evolution), followed by class discussion about facts and opinions presented regarding conventional versus organic systems. In course surveys, the lesson has been positively evaluated by students as one of their favorite sessions.

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Significant Learning in an Agricultural-Integrated Marketing Communications Course

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Students come from diverse backgrounds and have different learning styles. Therefore, it is important for instructors in agricultural disciplines to provide them with a variety of ways to connect, not only to the course material, but also to each other and to the agricultural industries they will someday enter. When these important connections occur, they can be life-altering and the learning is significant. Determining the occurrence of significant learning can help educators in agricultural disciplines create pedagogical frameworks that produce students who are better prepared for careers in agriculture. The purpose of this study was to determine if the 15-week course Integrated Marketing Communications for Agricultural Industries fostered significant learning. Twenty-six students completed a qualitative reflection questionnaire consisting of open-ended questions regarding their thoughts and feelings about what they learned and how they would apply the knowledge in their future careers. Content analysis with an open coding technique was used, and the domains of Fink's taxonomy of significant learning served as the codes to describe and classify the data. The results of the data analysis provided confirmation of significant learning in all six domains. The greatest evidence of significant learning was revealed in the application, integration, and human dimension domains. Future research should examine ways to strengthen learning in the learning how to learn, foundational knowledge, and caring domains.

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Strategies to Improve Experiential Learning Opportunities at a University Equine Center

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A new organizational structure and strategic plan for the Clemson University Equine Center (CUEC) was designed to improve student experiential learning outcomes. Programmatic changes to the CUEC included replacing farm management staff, improving and maximizing student employee output, decreasing herd size, developing co-curricular programs, and completing infrastructure improvements. A faculty director was instituted to liaise between faculty and student users and farm staff, supervise farm management, direct the mission of the farm, increase branding and fundraising capabilities, ensure adequate resources for users, manage herd size and other resources, and manage operating budgets. Through strategic efforts, the CUEC became more financially and socially sustainable, mitigating a \$65,000 operating deficit and hiring new staff. Beyond course work and hands-on laboratories, the CUEC added more than 12 new programs for students to develop equine science and management experience, career exploration and networking. Results from these opportunities include a 50% increase in number of students served through the farm. The CUEC also increased on-farm immersion experiences by 100% for Equine Business students. Approximately 400 students a year are involved in one or more courses, laboratories or other experiential learning opportunity at CUEC. The added experiential learning opportunities at the CUEC enhanced student preparation for career placement. There was a 20% increase in career placement in equine or animal industry/health jobs in the previous 5 years, with a 73% direct placement in 2017. Other colleges and universities might benefit from similar programmatic developments to improve overall impact on student development.

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Dyads and Friends: Perceived Communication Competencies in Academic Advising

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Through many stages of a college student's development, they frequently have one constant guide to help them navigate the educational bureaucracy and their personal and professional growth: their academic advisor. Successful student-advisor relationships are built on clear communication and trust. Frequently, advisors have limited time and resources to communicate meaningfully with all their advisees. Previous research found that university faculty and administrators in agriculture programs value advising but would benefit from additional advising skill-building exercises. Therefore, educators and administrators need an understanding of advisors' communication competencies to better enable them to perform this crucial task effectively and efficiently. The purpose of this study was to investigate academic advisors' Self-Perceived Communication Competencies (SPCC). We purposively sampled a group of advisors attending an academic advising conference (N=180) and utilized an electronic questionnaire to measure SPCC. The questionnaire measures perceived competency in four contexts (public, meeting, group, and dyad) and three audiences (stranger, acquaintance, and friend). Participants from 12 institutions responded (n=140; 77%). Advisors reported highest SPCC in a dyad (one-on-one setting) and with friends more than any audience and had an overall SPCC of 82 (scale=0-100). We conclude that academic advisors vary greatly in their SPCC, but that their level of comfort in dyads supports positive advising communication. Educators and administrators should use these data to develop support and programs to enhance communication competencies and further equip advisors to impact students.

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Multi-State and Multi-Disciplinary Partnership Effort: Nexus of Food and Nutritional Security, Sustainability and Hunger Graduate Course

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The need for innovative educational strategies and collaboration across multiple disciplines in teaching complex issues such as food security is important to help students understand the complexities of 21st century grand challenges. Recognizing this issue, Texas A&M University in partnership with Purdue University, and Ohio State University created the Food Security Educational Partnership. This grant-funded project developed a new multi-institutional and multidisciplinary course utilizing a flipped class model that engaged students in learner-centered teaching and experiential learning experiences to enhance graduate education regarding food and nutritional security, sustainability, and hunger. The goal of this course was to promote interdisciplinary learning by engaging 30 graduate students from different disciplines across multiple institutions to think critically about food and nutritional security. Students completed a pre and post-questionnaire and two course reflections to gauge students' learning experiences and the development of interdisciplinary thinking skills, learning capacity, and motivation to learn. Based on the data collected from the post-questionnaire, we found that 84% of respondents felt that experiential learning helped them understand the content and the course improved their understanding of concepts. Moreover, 89% of respondents felt motivated to learn in the course, and 90% felt that they devel-

oped interdisciplinary thinking skills. These findings contribute to helping educators understand the relevance and importance of learner-centered teaching methods in addressing 21st century grand challenges such as food security. This project was funded by the USDA-NIFA # 2014-70003-22356.

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Video Killed the Word Document: Using Videos to Provide Electronic Feedback

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As science communicators and educators strive to engage and equip a modern workforce, we must engage and empower visually literate students, and match the media delivery of the modern environment. We found a solution to the potential gap in media consumption and educational delivery in seeking an answer to a different, but no less pervasive problem: How can we give deep and engaging feedback on assignments without spending weeks at a time grading? How can we dedicate time and resources to our many other duties without forcing students to make sense of ambiguous phrases in comment bubbles or decipher illegible scribbles in a margin? Enter video feedback. We replaced traditional written feedback on major assignments in three agricultural communications courses (two media writing courses and a photojournalism course) with video feedback. For this innovative teaching approach, we recorded 5-10-minute videos using a free web-based app called screencast-o-matic. The app recorded a defined area of a computer screen, so students could see the assignment in real-time and a webcam recorded the instructor's face for nonverbal cues. The app captured features enhancements like mouse indicator halos for greater visibility. In each video, instructors crafted personalized feedback relating to strengths, weaknesses, and instructions for improvement. Paper rubrics complemented the videos. Students responded overwhelmingly positively in all courses. They reported greater

knowledge gains, deeper connection with instructors, and increased self-efficacy, among others. Educators in other disciplines should consider adding video feedback to decrease grading time and enhance the impact of feedback.

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Using an Agriculture Club to Enhance Student Learning, Engagement and Development

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The Agriculture Club plays a vital role in the scope and effectiveness of the Agriculture Program at SUU. Activities associated with the club help fill voids in accomplishing our mission that can't always be done in a classroom/lab setting. The focus areas used to accomplish these objectives are: service; skills development; academics; social; and recruiting. With service, students get involved in university and community projects such as Farm Field Day where working with the extension service, third graders come to a field day to learn about the agriculture industry. Students help plan, present and oversee the activities. Under skills development, students participate in leadership/followership roles, develop teamwork skills and being a Farm Bureau collegiate chapter, participate in discussion meets to hone communication skills. For academics, the club invites in guest speakers and also coordinates our annual agriculture trip. Under social, the club organizes campus activities and provides mentoring for newer students. Students feel a sense of belonging and build life-long relationships which can also impact student retention. Lastly, the club members are involved in recruiting efforts where they engage with hundreds of high school students. The question arises about how to get students involved in the Agriculture Club. Two required classes are included in their core that uses the Agriculture Club as the vehicle to achieve these objectives. Student evaluations are used to evaluate the value of this program in

enhancing their learning, engagement and overall development.

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Can We Meet the Needs of the iGeneration?: Exploring Effective Technology Integration Needs of Educators

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Technology is increasingly prevalent throughout all levels of education. The effective use and integration of technology within a learning environment can have a profound impact on students and their acquisition of knowledge. More importantly, current students prefer the integration of technology in educational settings in a wide range of disciplines. However, can educators effectively utilize such technology to meet the educational needs of the iGeneration? Technological Pedagogical Content Knowledge (TPACK) is an educational framework used to describe the knowledge and skills teachers need to effectively integrate technology into their instructional practices within three areas of knowledge: technology, pedagogy, and content. With the potential positive learning impacts from effective technology integration in mind, this pilot study sought to establish a baseline measure of preservice teachers TPACK. The TPACK survey was administered to all preservice agriculture teachers (N=40) at two regional universities. Findings suggest preservice teachers possess some of the requisite knowledge and skills to effectively integrate technology into their teaching, experience limited exposure to faculty effectively integrating technology within their content area, and lack coursework that focuses on technology integration in learning environments. Intervention modules with

assignments designed around the TPACK framework are currently in development for use in undergraduate teaching methods courses. Additionally, professional development opportunities are being developed for college teachers of agriculture that focus on effective technology integration in specific content areas. Future research will focus on faculty members within colleges of agriculture TPACK measures, identify existing technology pedagogy deficiencies, and inform professional development efforts.

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Instructional Resources to Teach Science Concepts while Promoting Careers in Horticulture

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Online instructional resources are being developed to provide high school educators with engaging learning tools to empower them to teach challenging STEM concepts currently applied in horticulture. Three modules: Science and Technology in Horticulture, Hydroponic Food Production, and Light Quality and Plant Responses, will align with agricultural education and science standards, but input from agricultural educators was sought to guide development of this content. A survey was completed by 62 respondents at the winter 2018 meeting of the Kansas Association of Agricultural Educators. When asked what instructional activities they are most likely to use, hands-on activities were rated highest (5.7+0.5 with 1=strongly disagree and 6=strongly agree), followed by video clips and demonstrations/experiments (5.3+0.8 and 1.0, respectively). While they agreed that they currently teach about careers in horticulture (5.0+1.1), they only somewhat agreed (4.0+1.0) that they currently teach about innovative technology used in the field. They were most interested in teaching about the use of drones (4.9+1.0) compared to robots (4.5+1.1) or artificial intelligence (4.5+1.1). Respondents agreed that they were familiar with greenhouse operations (4.5+1.2), but less confident about

building a hydroponic system (4.1+1.2), and even less confident about teaching students how to manage nutrients in hydroponic systems (3.9+1.2). They somewhat agreed that they know ways in which light quality affects plant growth (4.0+1.0), but more strongly agreed that they would like to incorporate LED lights into their instruction (4.5+1.0). Survey results provided useful information to guide development of the instructional resources to meet needs of agricultural educators.

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Integrating Service Learning into a Companion Animal Science Course Designed for Pre-Veterinary Science Majors

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The economic and social significance of companion animals to families and individuals warrants the need for more knowledge and understanding of companion animal care for maintaining the health, well-being, and longevity of the animals. Courses that focus on companion animal sciences prepare students to better understand and address the needs of pets during all stages of the animal's life. They also prepare students for careers in small animal veterinary medicine and pet care. Lipscomb University's Department of Biology revised its curriculum to include two new animal science courses: Animal Nutrition and Companion Animal Science. These two courses were developed to closely meet the needs of Pre-Veterinary Science Majors. Companion Animal Science was developed as a service learning course was launched in August 2013 and is taught every other year. To successfully complete the course, students must complete a service learning project with a community partner organization at the end of which they submit a reflection paper. Since its inception, 37 students have completed the course and have all been successful in working with various companion animal organizations such as veterinary clinics, animal shelters, and other entities that utilize animal assisted therapy. Students'

reflection papers indicate that the service learning component of the course has enhanced their learning and knowledge about the companion animal industry. This presentation highlights experiences in incorporating service learning into a companion animal science course.

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Using Challenge-Based Learning Theory to Teach Basic Electricity Concepts and Skills to Youth

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Involving youth in a meaningful and engaging learning process is critical when teaching STEM-based subject matter content. The goal of this project was to develop a school-based educational program (Electricity for Youth) that would teach youth in grades 4 and 5 key basic electricity concepts and skills using challenge-based learning strategies. The educational program uses challenge-based learning strategies to create an engaging and exploratory learning environment that will inspire youth in grades 4 and 5 to develop a greater understanding of basic electrical principles. The curriculum developed includes a 52-page facilitator's resource guide, learning objectives matched to the appropriate state and federal educational learning standards, an interactive computer-based student curriculum, the "Power Grid" memory game, a challenge-based hands-on wiring board, and an extensive set of wiring diagrams for parallel and series circuits. The weeklong educational program was pre-tested in two 4th grade and one 5th grade classrooms reaching 72 youth. Observational feedback, reinforced with written comments from teachers, revealed that students really loved the "hands-on" aspect of the program, found the interactive computer-based program to be fun and easy to complete, enjoyed testing various classroom items for conductivity, and liked the electrical components matching game. In summary, Electricity for Youth is a comprehensive, challenge-based, hands-on learning program for use in formal and non-formal

educational settings that excites youth motivating them to engage in the learning process.

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An Innovative Agricultural Science Education at a Non-Land-Grant University

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The US agricultural industry offers close to 55,000 new, skilled and technical jobs every year of which 5,000 to 6,000 remain unfilled each year. South Florida is the home of large nursery and tropical fruit industries and is at the door step of the Latin American and Caribbean agricultural trade flow. Thus, clearly there is a huge demand for agricultural jobs locally and nationally. Further, we address a specific educational problem and take advantage of an opportunity presented to Florida International University. A large number of Hispanic and other minority students in the southeast Florida, coming from ethnically close-knit families, prefer to stay within the region for higher education. FIU attracts a captive audience of outstanding multi-cultural students for the above reason. Our Program incentivizes such graduates to pursue agricultural science education right here at FIU. With this critical need, we built a curriculum with a sequence of upper division agriculture science courses, internships, experiential and experimental learning, workshops, presentation skills, community engagement, and leadership building. With an innovative recruitment strategy, we started with two students in 2016. Currently we have 50 majors in the program and expected to reach 100 in next two years. Some of the foundation courses – soils, agroecology, and sustainable agriculture started with four students. Currently each course gets an enrollment close to 40 students each year offered. Our curricular and co-curricular activities encourage 4-year graduation rate. Under the proposed program, we have been successful in pipe-

lining students in USDA jobs and other agricultural industry jobs locally and nationally and continue to produce graduates who would qualify for these jobs.

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Experiential Learning in Environmental Control of Animal Production for Minority Students

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America is facing a serious challenge in educating sufficient numbers of women and minorities in STEM disciplines. The animal industry, the largest food production and revenue-generating sector of agriculture, needs a competent workforce of professionals with ethnic and gender diversity to be trained with engineering knowledge and emerging technologies for sustainable animal production. The objectives of this study were to develop experiential learning activities for minority students to help them draw connections between the animal's needs, the role of engineered facilities and technologies to meet these needs, and real-world problems and challenges in animal production. Experiential learning workshops were developed through a multi-disciplinary and multi-institutional collaboration to reach minority students at undergraduate and graduate levels. At North Carolina Agricultural and Technical State University (NCAT), the four half-day summer experiential learning workshops on indoor environment control for human residences and controlled environment animal production were offered over

two summers to minority undergraduate and graduate students in animal science, animal health, and animal production environment majors. Upon successful completion of the workshops, our evaluations including pre and post testing and student group presentations showed that the minority undergraduate and graduate students in animal production related disciplines have increased their comprehensive knowledge and competencies for future career placement to serve the animal production industry. This presentation reports the experiential learning programs for minority students and the preliminary evaluation results of the experiential learnings. The experiential learning workshops can be offered to minority students in other institutions.

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Technology-Enhanced Faculty Development in Controlled Environment Animal Production

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A competent workforce of professionals who understand emerging environmental control technologies for food animal facilities is needed. A series of eLearning modules on controlled environment animal production was developed through multi-disciplinary, multi-institutional collaboration, funded by the USDA/NIFA Higher Education Challenge Grants Program. Early in the project, the team developed and participated in a series of on-line faculty development webinars on

course design. Twelve team members representing five universities worked together in shared Course Design Institute webinars. During the institute, participants learned backward design principles to jointly develop goals and objectives for a connected series of 20 modules, appropriate evaluations to assess student mastery of those objectives, and learning activities to help students achieve the educational objectives. A wiki website also facilitated cooperation. The result of the on-line institute was a set of shared goals and objectives for the overall course and a basic structure for each topic-specific module including assignments, assessments, and course outlines. These modules can be easily adapted by faculty teaching courses in agricultural engineering, animal sciences, and veterinary medicine. In the long term, the project will directly contribute to workforce training for the animal production industries with expected impacts on abatement of and adaptation to climate change, improved animal health, welfare and productivity, decrease in food safety concerns, adoption of renewable energy systems on farms, improved air quality, and sustainable animal feeding operations. This collaborative effort may serve as a model for addressing the need for innovative approaches for curriculum design in Food, Agricultural, and Environmental Sciences.

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An Integrated Scientific Writing Course Supports Graduate Student Success in Research Publication

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Graduate students are expected to publish their research outcomes in peer-reviewed scientific journals. Many students, including non-native English speakers, are not well prepared for this

task because they have had few opportunities for formal instruction in scientific writing. To address this curriculum deficiency, faculty from related disciplines at New Mexico State University and Ohio State University jointly utilized an instructional process developed at Iowa State University that requires students to create a complete manuscript organized around core “take home” messages. Also integrated into this process was an approach to help students overcome writing barriers by implementing a goal-oriented writing schedule. Further, we have incorporated resources tailored for non-native speakers of English. Experiential learning was accomplished by in-class peer review of short writing assignments as well as of the complete manuscript. This approach emulated peer-review in the publication process. We required students to establish writing schedules and report progress through personal diaries. Questionnaires, mid-semester instructor-student meetings, and comparisons of “earlier” vs. “later” writing samples enabled measurement of improvements in student confidence and ability. Based on these observations and assessments, combined with student evaluation of instruction instruments and post-course success in publication of student-authored manuscripts, it appears that the integration of these instructional elements have had measurable, positive impacts on student writing. Questionnaires indicated that, over the course of a semester, students became 17% to 55% more confident in their ability to take a lead role in writing a high-quality peer-reviewed, scientific journal article.

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**I See Myself When I Serve Others:
Service Learning to Develop Mechanics
Skills in Teachers**

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Service learning is the purposeful integration of a service experience in an academic setting that allows for student reflection within clearly identified learning objectives. Research recommends more exposure to agricultural mechanic's methods could decrease the gap between efficacy and self-perceived ability. This study used Bandura's social cognitive theory (SCT) to understand the relationship between service learning and self-efficacy, after a mechanics related service learning experience. Student reflections were analyzed using the constant comparative method. Bandura described four types of learning experiences within SCT, analyses yielded; 13 instances of mastery experience, 29 instances of vicarious experience, 25 instances of social persuasion experience, and 72 instances of physiological and emotional state experience mastery were noted. Within each type of experience, two major themes emerged associating data as either "Student as Student" or "Student as Teacher". The theme of "Student as Student" describes the personal reflections of students experiencing various physiological and emotional states, confronting or succumbing to social persuasion, vicariously learning from peers, and mastering skills through hands-on application. The theme of "Student as Teacher" describes a significant change of perspective where students begin to view themselves as teachers. Students begin to describe how to deal with students in various physiological and emotional states, understand the effects of social persuasion, take advantage of vicarious learning, and develop mastery experiences. Students went from viewing themselves in the role of student to that of a teacher. Students began to

consider how they might guide their future students through a similar experience to achieve mastery.

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**Facilitating Baccalaureate Program
Enrollment in Two-Year College
Students: A Case Study**

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Agriculture students who choose to begin a college career at a two-year college may decide to continue their education beyond the associate degree to enhance their career opportunities. This case study examines the strategies employed in a partnership between the Nebraska College of Technical Agriculture (NCTA) and the College of Agricultural Sciences and Natural Resources (CASNR) at the University of Nebraska-Lincoln which resulted in a transfer student increase from two students in 2013 to 15 students (18% of graduates) in 2017. An analysis of successful strategies may be beneficial to other colleges and universities wishing to increase transfer between two and four-year institutions. Strategies employed to successfully increase the completion of a baccalaureate degree included: the implementation of a detailed articulation agreement including multiple degree plans for baccalaureate completion in four years; granting CASNR faculty status to selected NCTA faculty thereby allowing NCTA faculty to teach courses for CASNR credit on the NCTA campus; modifying NCTA general education courses to include the same course name and student learning outcomes as the analogous UNL course; implementing a "Link to Lincoln" agreement facilitating joint advising, visiting student status prior to transfer, and a multi-semester series of "transfer track" activities; and developing a reverse transfer agreement between the institutions. After implementing these initiatives, student transfer from NCTA to

CASNR increased from approximately 2% in 2013 to 18% in 2017 demonstrating that partnership initiatives between two and four-year institutions can significantly increase student goal acquisition as measured by transfer to baccalaureate programs.

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Increasing Student Comfortability in a Livestock Handling, Safety, and Welfare Course

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Many undergraduates have limited livestock handling experience when they come to college. To address this issue, a course based on livestock handling, safety and welfare was implemented in the Department of Animal Science at Iowa State University. The intended learning outcome was for students to become comfortable when handling and interacting with livestock. The course was delivered as a lecture-laboratory format. In

lecture, students learned about specie perception, while the labs provided handling and moving interactions. Each semester, a pre-course survey was administered during the first-class period (N=132). This survey collected information on prior handling experience and comfort level by specie. At the semester conclusion, a post-course survey was given to determine if the course was effective at improving a student's comfort level (N=115). Upon completion of the course, students reported that their level of comfort increased from 53.8 to 75.7% with horses, 37.8 to 66.9% with poultry, 54.5 to 80.9% with swine, 53.7 to 72.2% with beef cattle, 49.3 to 84.3% with dairy cattle, and 48.5 to 78.3% with sheep. Roughly 96% felt that the hands-on approach was beneficial at reinforcing material learned in lecture (N=115). An additional survey question in later semesters reported that 100% (N=71) of students felt that they were more likely to voluntarily interact with livestock inside or outside of the classroom setting after completion of the course. This student feedback has shown that the course design was effective at achieving our learning objective.

Poster Presentations

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Health Solutions: Promoting Interdisciplinary Thinking

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Educational literature and professional practitioners report that solutions to challenging issues in science and society are ideally developed within an interdisciplinary context. Thus, inculcating interdisciplinary thinking skills is a critical responsibility of science faculty. The purpose of this project was to assess the effectiveness of two software modules in promoting interdisciplinary problem analysis. Students completed a software based instructional module (Health Solutions) related to weed management practices. Subsequently, students utilized a second module (Challenges-Choices-Consequences) that presented them with a series of weed management challenges. Each challenge was associated with three potential management response choices. Selection of each choice was linked to qualitative and quantitative consequences in production/profits, ecosystem health, and human health. A post activity survey was employed to evaluate the premise that the module-based activities promoted interdisciplinary thinking. Ninety-two percent of students agreed or strongly agreed with the statement “Completing the two health solution programs has helped me better understand the multiple factors involved in developing a weed management plan that includes public health considerations.” Other survey responses supported the premise that the modules helped to promote interdisciplinary thinking, with the goal of generating potential solutions. Substantial time is required to develop interdisciplinary, interactive activities tailored to a specific topic such as weed management. Student centered activities also reduce time available for didactic presentation of concepts. These concerns notwithstanding, results suggest that these activities can play a helpful role in fostering critical interdisciplinary thinking skills in science students.

001

Evaluation of Undergraduate Student Critical Thinking in Animal and Food Sciences

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One goal of undergraduate education is to improve student critical thinking. Unfortunately, students have inherent biases in their ability to think critically. The objective of this experiment was to evaluate how demographic classifications impact a student’s confidence and ability to think critically. A total 259 freshmen enrolled in Animal Sciences and Industry or Food Science and Industry at Kansas State University completed a 100-question International Critical Thinking Basic Concepts & Understanding Online Test in Fall 2017. This assessment focuses on 5 essential dimensions of critical thinking: 1) analysis of thought, 2) assessment of thought, 3) dispositions of thought, 4) skills and abilities of thought, and 5) obstacles or barriers to critical thought. Each student received a resultant score out of 100 total points, and data were analyzed using the GLM and CORR procedures of SAS (SAS Inst., Cary, NC). First generation students were less confident ($P < 0.05$) in their critical thinking ability than their peers who had at least one guardian attend college. However, there was no measurable difference ($P > 0.10$) in their critical thinking ability. Critical thinking score increased ($P < 0.05$) with the number of academic hours in which the student had previously taken, and strongly predicted ($R = 0.731$) student GPA in their first semester. Future research will follow the cohort of students through their undergraduate career to best understand influencers of critical thinking in undergraduate education in animal and food sciences.

002

A Decade Review of an Agricultural Residential College

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The purpose of the study is to review the evolution of an Agricultural Residential College (ARC) program over the past 10 years, including its history, an overview of student activities, and evaluation practices. ARC welcomed its first students, in fall 2008, in a newly renovated residence hall. In the first year, students were enrolled in several sections of the same courses, as well as in an ARC-only section of a freshman writing course in the fall and a speech communication course in the spring. Two years later, the Associate Dean became the director of the program and major-based “tracks” led by faculty were introduced: two in animal sciences and one each for environment/sustainability and food/fitness/fashion. Other changes were ARC-only sections of a required orientation-type course, agricultural-specific field trips, and a weekly e-newsletter. Under new faculty direction in 2014, the program shifted to a more explicit focus on career exploration, agricultural literacy and undergraduate research, as part of the University’s QEP. The tracks were reorganized, and additional faculty members were recruited to provide seven individualized track experiences to provide even more hands-on learning. The large single section orientation course was also divided into multiple sections of fewer students. Focus group interviews of participants and senior alumni of the program suggest that the ARC has been and continues to be successful in a variety of ways. As the program moves into the next academic year, a new 1st year residency program is presenting even more opportunities for growth and development.

003

Integration and Success of Study Abroad Program for Animal-Related Majors at UC Davis

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Integration of a comprehensive study abroad program for students in agriculture majors creates competitive, well-prepared students with global understanding. In the Department of Animal Science at UC Davis in the last three years we have developed a flourishing study abroad program where none existed previously and have experienced an overwhelming response both from students and partner universities which has resulted in large numbers of our students going abroad, attracting international students to study abroad in our program and creating new networking opportunities with staff and faculty globally. Specifically, in the 7 years prior to development of our program on average 4 of our students per year studied abroad. In the past three years we have sent 79 students abroad, 19 of our students are enrolled to study globally this academic year, and 161 other students have expressed an interest in studying abroad before they graduate. We also have had one student per year study in our department as a reciprocity exchange from Denmark, and this year have added a second student from Melbourne Australia. In addition, academic data has demonstrated almost an entire letter-grade improvement in a year-long physics series, among our students, if completed abroad. Incorporating a strong program with study abroad opportunities allows agricultural students to participate in unique opportunities, making them more competitive for application to professional programs and preparing them to be global citizens as they serve their communities.

004

The Food Literacy of College Students

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The purpose of this study was to develop a multi-faceted survey to better understand food literacy. The first objective was to assess (a) nutrition and food knowledge, (b) perceived confidence in cooking, (c) cooking experience, and (d) perceived comfort in cooking. The second objective was to investigate the relationships among these constructs. College students (n=930) completed the paper survey during class time. Nutrition and food knowledge was measured by a 37-item test. Perceived confidence in cooking comprised 19 total items. Cooking experience was measured by 12 items. Cooking comfort comprised 16 items. Items from each variable were summed into single composite measures. Based on descriptive statistics, most respondents had some correct knowledge about nutrition and food. Most students were somewhat confident of their overall cooking abilities. They were not as experienced in overall cooking experiences. They were, however, comfortable in using a variety of cooking utensils, equipment, and small appliances. Correlations between all four variables were significant ($p < 0.001$) and in the positive direction. This finding indicates that students who have more correct nutrition and food knowledge also have more confidence ($r = 0.21$), experience ($r = 0.17$), and comfort cooking ($r = 0.30$). Cooking confidence, experience, and comfort were strongly correlated indicating that they may be measuring the same latent construct. The Pearson's correlation (r) efficient between confidence and experience was 0.69, and the correlation efficient between confidence and comfort was 0.71. Food literacy is an important global issue, one in need of more research and dialogue.

006

How Do Antibiotics Actually Work? A Combined Wet-lab and In Silico Activity

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Understanding how antibiotics/antimicrobials function is a prerequisite for understanding more advanced concepts in Food Safety, which are, in turn, a key part of a food science education. However, antibiotics/antimicrobials are often misunderstood. Here, food science undergraduates learned how antibiotics/antimicrobials affect pathogen cell division and death. The objective of the activity was to learn two biochemical concepts describing antibiotic function: (1) bactericidal versus bacteriostatic activity; and (2) competitive versus non-competitive inhibition. For (1), students treated non-pathogenic *S. pneumoniae* with penicillin (a known bactericidal antibiotic) and/or a choline kinase inhibitor (CKI), an antibiotic with an undetermined mechanism of action. Bactericidal antibiotics modify the bacterial cell wall and provoke autolysis, while bacteriostatic ones affect metabolism and slow cell growth. Students observed reductions in optical densities at 600 nm (O.D.600) over time, indicating autolytic activity. A steady O.D.600 indicated bacteriostatic activity. For (2), students modelled CKI binding to the active site of the choline kinase enzyme of *S. pneumoniae* using the in silico tools Pymol and Patchdock. The goal was to visualize if CKI could competitively inhibit choline kinase by blocking natural substrate entry. A pre- and post-activity exam which focused on antibiotic and inhibitor mechanisms of action was administered. A mean improvement of 5 correct answers out of 15 was observed. Students also scored highly on classroom performance and laboratory report scales (mean > 90%). Together, these results revealed a substantial improvement in understanding of antibiotic/antimicrobial function. Combining wet-lab and in silico tools is a promising approach for making biochemical concepts more accessible.

007

Yogurt as the Bridge Between Biochemistry, Microbiology, and Food Science

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Students often find biochemistry concepts difficult to understand. If an understanding of biochemistry is a prerequisite for more advanced subjects, student success is affected. We developed a laboratory experience to help undergraduates better understand biochemical concepts using yogurt and its effects on health as a topic of study. The lactase activity of strains found in yogurt is linked to the reduction of lactose intolerance. However, not all yogurts have the same composition. Food Science undergraduates joined an ongoing research project where they determined the strain composition of commercial yogurts and quantified the lactase activity of yogurt bacteria as a measure for their potential to treat lactose intolerance. This experience opened discussions into the health properties of probiotic food products and relevant biochemical pathways. The Intrinsic Motivation Inventory (IMI) was used to assess intrinsic motivation and a 15-question exam administered before and after the activity was used to assess improvements in student understanding. An analysis of IMI scores showed a mean of 4.6/7 for the "interest/enjoyment" subscale. A strong positive correlation was also found between the "perceived competence" and "interest/enjoyment" ($p < 0.07$, confidence=0.93). Student understanding of relationship of biochemistry improved as evidenced by a significant improvement in exam scores (from an average of 8.4 to 11.6, $p < 0.05$). We show here that a yogurt-based activity can be used bridge the gap in understanding between biochemistry concepts and food science. Using food as an educational tool to teach biochemical concepts is a promising method for making these concepts accessible.

012

Advancing Your Market Project

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Youth who raise market animals are unaware of what happens to the animal after fair. There is an apparent lack of knowledge regarding processing procedures. Based on Kolb's Experiential Learning Model, this innovative teaching approach utilized two hands-on meat-science learning sessions wherein 4-H youth were taught to process fresh sausage and jerky. Through a short presentation followed by an interactive session, youth were taught about cuts of meat, withdrawal dates on vaccinations, proper feeding and water schedules and adequate shelter for market animals. Participants were also taught how to select, season, grind and properly prepare and store various cuts of meat. While listening to instruction about the curing process, youth selected their own sausage and spiced it according to personal preference. They then cut and measured the meat while focused instruction on kitchen, equipment and knife safety and scale balancing was delivered. After the correct amount of meat had been cut, youth were taught how to use an electric grinder to produce course and fine mixes. To conclude the session, participants were taught how to cook the products to proper internal temperatures and properly package them for storage. To date, over 434 youth and leaders in 19 different classes have completed one of the courses. Per an end-of-course evaluation, participants reported an increased awareness of processing procedures as well as an overall enjoyment of the interactive educational sessions. As an expansion, the sessions have been offered to Native American youth with similar results for processing venison and buffalo.

014

A Team Approach: Pairing up with Industry to Offer Effective Professional Development

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Inviting agricultural industry experts to offer targeted professional development to a group or organization is not a novel concept. However, intentionally combining the efforts of University faculty and industry experts to develop, facilitate, and evaluate a professional development workshop is slightly less common. For this project, faculty partnered with Farm Service Agency (FSA) representatives to host a professional development workshop for high school agricultural educators on increasing the awareness of youth agricultural loans. Primary objectives were to (1) evaluate the effectiveness of the professional development on participant knowledge gain, (2) explore funding areas of interest to participants, and (3) determine the direction of future professional development. The workshop began with an overview of the agricultural loan program followed by an in-depth, participatory group discussion. All participants (N=34) were administered a perceptions survey prior to and upon completion of the workshop. Even though approximately two-thirds of the participants indicated a previous awareness of the FSA youth agricultural loan program, 78.1% reported a substantial increase in their knowledge levels regarding the loan program. Participants specified buying livestock for student projects would be the area of most interest. FSA representatives were then able to discuss qualifying loan opportunities and directly address participants' concerns. Having this team approach allowed for immediate input and feedback on qualifying projects, loan amounts, eligibility, responsibilities, and record keeping. This partnership was an effective delivery approach to build credibility, diversify the topic, connect with industry, stay current on agricultural issues, and provide direction for future educational efforts.

018

Do Student Goals, Motivation, and Confidence Predict Exam Scores?

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Students (N=138) in a freshman entomology class were studied to determine if exam score goals, motivation, importance, and confidence were significantly ($P < 0.05$) related to actual exam performance. Two weeks prior to each of two exams, students completed a survey reporting their goal for the exam (0 to 100 points) and their levels of motivation, importance, and confidence associated with achieving this goal (1=Not motivated/important/confident and 5=Extremely motivated/important/confident). For Exam 1, the mean exam score goal was 95.9 (SD=4.2), with a range of 90 to 100. Despite high levels of reported motivation (M=4.0), importance (M=4.3), and confidence (M=3.9), the actual mean for Exam 1 was 79.5 (SD=14.8), with scores ranging from 14 to 100. There was no significant correlation between actual exam scores and score goals ($r=0.15$), motivation ($r=-0.02$), importance ($r=0.04$), or confidence ($r=-0.01$). For Exam 2, the mean score goal was 94.5 (SD=5.3), with a range of 80 to 100. Reported motivation (M=4.2), importance (M=4.3), and confidence (M=4.0) were high. The mean score for Exam 2 was 84.1 (SD=15.3), with scores ranging from 13 to 100. Exam goal ($r=0.31$), importance ($r=0.30$), and confidence ($r=0.31$) were significantly related to actual scores. Overall, students became somewhat better judges of their likely exam performance between Exam 1 and Exam 2.

020

Exploring the Influence of Course Elements on Students' Approaches to Learning

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Researchers have identified three approaches to learning – surface, strategic, and deep. These approaches are influenced by various contextual and student factors, including teaching methods, assessments, and relevance to future career. The objectives of this study were to: 1) determine students' approaches to learning and 2) assess the influence of course elements on students' approaches to learning in an introductory Food Science and Human Nutrition Course. Seventy-one of 91 students consented to participate and completed two surveys for both Nutrition and Health (NH) and Composition and Chemistry (CC) course sections: 1) Entwistle's Approaches and Study Skills Inventory for Students and 2) a survey developed to assess students' perceived usefulness of specific learning resources, assignments, and emotional connections to section content. Students' approaches to learning did not differ significantly between NH and CC sections; the majority used strategic (58 and 55) or deep (56 and 60) compared to surface (12 and 19) approaches, respectively. Generally, positive correlations were obtained for deep and strategic learners and their perceived usefulness of learning resources and assignments. In stark contrast, negative correlations were obtained for surface learners and their perceived usefulness of learning resources and assignments. In regard to emotional connections to content, in general, compared to deep and strategic learners, surface learners did not enjoy and felt anxious about learning content in both sections. Similarly, negative correlations were obtained for surface learners and their exam scores in both sections. Instructors need to implement strategies that help students eliminate surface approaches to learning.

021

Assessment of a Learning Community in Agribusiness Education

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The goal of this research is to assess the effect of enrollment in a learning community on a student's knowledge of agriculture and confidence in sharing that knowledge with others. We study the 28 participants enrolled in a "Discovering Agribusiness" learning community during fall 2017. We compare the experimental group to a control group of freshmen enrolled in a department major but not in the LC – approximately 105 students. The learning community consisted of a course organized around field trips to local agribusinesses and non-class social interaction events such as corn maze, movie night, athletic events, and visits to instructors' homes. Departmental advisors recruited students to enroll in the LC during summer, new student Summer Transition, Advising, and Registration (STAR). Advisors strongly encouraged students from non-agricultural backgrounds, but it was not a requirement for enrollment. We collected the data prior to fall pre-registration in March via internet survey. Students completed an eight-item survey gauging knowledge and confidence levels. The a priori expectation is that the students enrolled in a learning community have larger gains in knowledge and confidence.

022

Student Perceptions of an Ireland Study Abroad Experience

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The objective of this study was to determine student perceptions of a ten-day embedded international educational experience to Ireland as part of a 2016 course sequence Hort 499H "Walking in

the Footsteps of the Irish During the Potato Famine: Examinations of New World Crops in Old World Societies.” Hort 499H consisted of a two-credit course during the Spring semester that culminated with a one-credit Maymester travel to Ireland to visit locations associated with the Famine. Focus group questions and a survey were developed and administered on the last day in the country. Topics such as prior international travel, collegial interactions, skills gained or learned, perceived assistance of the experience in future career development, and likelihood of doing another study abroad were studied. Eight of the 13 students had travelled internationally prior, while 3 had not traveled outside of Pennsylvania. The students felt they had developed more positive peer-to-peer relationships than during a “traditional” course (at the end of the international experience, ten out of 13 students considered all the students in the class to be a friend) and had gained multiple different skills (such as the ability to use a map and a greater sense of independence). Long-term value of the experience was suggested by overwhelming positive responses to the survey statement: “This experience was one that has positively impacted me and will stay with me forever (mean 4.92 out of 5.00).” At the completion of the experience, all students indicated that they hoped to travel internationally in the future.

025

Kansas Youth Dream Careers as they Relate to State Workforce Needs

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The Kansas Department of Agriculture (KDA) estimates the agriculture, food and food processing sector has a direct and indirect output of \$62.8 billion, roughly 43% of the Gross Regional Product. These industries support 229,934 jobs or 12% of the entire workforce in the state. Educators need to know projected job openings and how efforts from KDA can assist in facilitating

workforce development. During the 2017 Kansas FFA Convention Career Fair, attendees were asked to list their dream jobs. The job could be in or out of agriculture. A total of 247 students responded. The results were then separated by field to match categories from the United States Department of Labor. A second analysis was utilized linking their responses with agriculture jobs from the career profiles from AgCareers.com. The jobs were separated by pathways: animal science, agribusiness, environmental science, etc. The animal science pathway was the largest with 103 respondents (41.7%) and the agribusiness group was 75 (30.4%). From the 2016 Workforce Needs for the Agriculture Industry in Kansas Survey, the largest percentage of anticipated workforce vacancies are in agricultural mechanics followed by careers in agribusiness. Only 28 (11%) of the respondents listed the technical/mechanical field as a career opportunity. Seventy-five (30%) of the respondents listed a career in the agribusiness category. Of the 86 career fields, respondents covered 25. The KDA workforce development team should expand conversations regarding opportunities in agriculture. This could work towards filling that gap between anticipated vacancies and students current interest in agriculture careers.

026

Waterfowl and Watercolors: Enhancing Undergraduate Students' Waterfowl Identification Skills

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Accurately identifying waterfowl species can help students better understand waterfowl ecology principles and appreciate biodiversity. These skills can be challenging, and effective teaching techniques are needed to enhance student learning. I tested if watercolor painting assignments could improve students' waterfowl identification skills. Students enrolled in the Waterfowl and Wetlands Management course (n=19) at Kansas State University were instructed how to identify waterfowl species using traditional methods (e.g.,

study specimens, photos). After 4 weeks of instruction, I measured baseline knowledge of students' waterfowl identification skills by administering a quiz (Pre-Test). Immediately after the Pre-Test, students were given watercolor painting supplies and taught to paint the heads of various waterfowl species and sexes. I assigned students a take-home assignment that involved creating 4 paintings of 7 waterfowl species (2 of each sex). Students had 7 days to complete the task and were administered an unannounced quiz (Post-Test) after turning in their painting assignments. Average Post-Test scores increased 13.19 points (range=-15-35) and there was a significant difference in the distribution of Pre- and Post-Test scores. My results suggest that integrating watercolor painting into waterfowl identification lessons may enhance student learning. This technique may be useful for other undergraduate courses that require species-specific identification skills.

027

Development of an Innovative Horse Judging Seminar and Experience

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Traditional methods to teach horse judging have included classroom education in combination with sample video and/or live horse show classes to judge. These methods, while educational, don't provide a true, real-life learning experience. The objective of this program was to develop an innovative judging seminar and experience which included classroom education in combination with a true hands-on experience judging a horse show under the guidance and supervision of professional horse show judges. Participants from across the country spent two days in a classroom studying class rules, procedures, protocols and examples. Then participants were able to apply what they learned in the classroom by judging a live horse show for two days. This seminar was an experiential learning opportunity and provided real-time feedback to the participants. When the

program concluded, evaluations were disseminated to participants to gather data about the effectiveness of both the seminar and the horse show judging experience. Results suggest the overall effectiveness of both the judging seminar and horse show experience was excellent. This innovative model for educating horse show judges proved to be an effective combination of traditional classroom education and hands-on experiential learning.

028

NACTA Teaching Tips Promote Participatory Learning

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Adoption of innovative teaching approaches is often constrained by current learning facilities, conventional semester schedules, and multiple challenges on students' available time. Comfort levels of faculty and students plus the need for large classes to accumulate credit hours and thus secure adequate budget further complicate innovation and use of small class activities outside the classroom. Moving outside the proverbial boxes, current schedules, and classroom spaces needs extra energy, innovation, and planning. An unseen "elephant in the room" is our own difficulty in overcoming "monoculture thinking" about what a class should be and how to design courses and

individual activities. To move beyond these constraints and get students highly involved in participatory learning, we have designed and tested several educational activities outside the classroom, many involving working with stakeholders in the farming and food systems arena. We have used these under the umbrella of agroecology, defined as the ecology of food systems. Here we discuss how innovations contribute to five competencies valuable to graduates in agroecology. NACTA Journal Teaching Tips section provides an accessible educational resource space where we can publish ideas to share with colleagues. Future innovations to this section could include adding video to teaching tips, exploring alternative blocking of courses to facilitate more learning off campus, and evaluation of how frequently and successfully these tips have been used by other educators. We encourage colleagues to innovate, evaluate, and describe their successes and failures with teaching innovations and to grow the forum of exchange using NACTA Journal.

032

Scholarship Interviews: Worthless, or Worth It?

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Use of interviews within university admissions processes is dwindling, but observations implied conducting scholarship interviews, independent of the admissions process, increased acceptance rates of incoming freshmen. This study was conducted to determine the impact of a scholarship interview on students' decisions to accept an admission offer from the agricultural college in a large, land-grant university. Longitudinal data for in-state freshmen who were accepted to the university (N=1,111) and offered scholarships were collected and analyzed over four recruitment cycles (2014-2017). Students who applied for a specific merit-based scholarship took part in a 30-minute interview (INT) with a panel of up to five faculty, staff, and alumni. All students who interviewed were offered some scholarship assistance; type and amount were dependent on the

interview. The INT group was compared to other freshmen who were offered scholarships solely based on academic merit; no interview was conducted (No-INT). Most of the INT group (79.5%, N=392) accepted their admissions offer, while less than half (44.3%, N=719) of the No-INT group accepted the admissions offer. When using categorical variables, data revealed a greater acceptance rate for the INT group across gender, ACT scores, and geographic region within the state. Furthermore, findings indicate that regardless of demographic indicators, students who participated in a scholarship interview were three times more likely to attend the university than students who did not participate in an interview. Consideration should be given to incorporating interviews into recruitment efforts to increase freshman yield.

033

An Innovative Approach to STEM Integrated Environmental Education

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There is a large amount of research outlining benefits to spending time outdoors. Studies have shown that being in nature can lead to an increase in well-being, physical health, and relaxation. Even with these benefits, many youths do not spend much time outdoors; they spend most of their time indoors. Through STEM integrated environmental education programming, youth can begin to spend more time outdoors and develop an appreciation for the world around them, while participating in pro-environmental behaviors such as planting a pollinator garden. By spending more time in the outdoors, youth can develop a stronger connection to their environment, which is the goal of environmental education. In this six-week STEM integrated program, 25 Girl Scouts aged 7-13 learned about the importance of pollinators and worked together to complete design-related challenges. This quasi-experimental program consisted of two groups, one of which had an outdoor experience included

with their STEM program experience. Results indicate that the program was successful in increasing cognitive engagement and interest in the outdoors for both groups of participants, but only those in the treatment group, with an outdoor experience, saw an increase in behavioral engagement. Including an outdoor experience with STEM programming could increase engagement of youth. Environmental education with STEM design challenges paired with an outdoor experience may be a way to get more youth interested and motivated to protect the world around them. Future research should look at the long-term effects of STEM programs to see if there were any behavioral changes in youth.

042

An Immersive Recruitment Event for Agricultural Degree Programs

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The STEM Food and Ag Council has reported that academic programs for agricultural disciplines are not able to produce enough graduates for industry needs. This decline in qualified graduates makes successful recruitment a top priority for colleges of agriculture. Research has shown that recruitment messages originating from academic departments were more influential than those originating from the college of agriculture. Similarly, recruitment strategies focusing on individual disciplines were more impactful than those focusing on general agriculture. This led the Agricultural Education department at the University of Arkansas to rethink their previous recruitment efforts. The objective of this innovative practice was to focus recruitment efforts into an event for one specific degree program that allowed high school students to have an authentic experience within the Agricultural Education department. Students who were interested in a specific degree program were invited to campus, allowed to participate in classes required for that major, attend a workshop about the industry, and network with the students and faculty of the department. Informal interviews were conducted before the event

regarding students' intentions on joining the industry, pursuing a major a specific agricultural discipline, and becoming a student at University of Arkansas. As the day progressed, students vocalized further interest in both the degree program and the profession as a result of the event. Anecdotal evidence left the faculty and current students with a positive impression of the participants' perceptions of the university and agricultural education. We recommend other agricultural departments explore the possibility of implementing a similar immersive recruitment event tailored specifically for their degree programs.

047

Hands-On Activities for Teaching Turf and Landscape Irrigation

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Students in the turf and landscape irrigation course (AGME 4973) at the University of Arkansas have a practical, hands-on orientation with a strong preference to learn by doing. This presentation describes several activities and projects I have developed to teach and reinforce basic irrigation principles. Students in the class have little or no irrigation experience, so the first day we assemble (dry-fit) a small residential system so students can see the various components (mainline, valves, laterals, swing pipes, heads, controller and wiring) and how they relate to one another. Students learn the importance of irrigation hydraulics by operating a typical irrigation rotor at different flows and pressures and observing differences in coverage. Students establish the relationship between elevation and pressure by pouring dyed water to various heights in a 10-ft vertical plastic column and recording the height and the pressure at the base of the column. To understand friction loss in pipes, students assemble various sizes and lengths of piping and determine the differences between inlet and outlet pressures at various flows and velocities. As culminating activities, student groups design and install at least two irrigation systems each semester. The first system is a temporary "above-

ground” system that students use to learn design, installation, adjustment, troubleshooting, and application uniformity testing. When possible, the second is an actual design and installation for a local non-profit. When this is not possible, a second, more complex above ground system is designed and installed. These activities help students understand irrigation principles and practices.

049

Experiences of Undergraduate Animal Science Researchers: A Preliminary Investigation

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Students at institutions of higher education in agriculture generally have a variety of applied, experiential, and hands on learning opportunities available to them. It is widely believed among scholars that undergraduate student researchers are more likely to pursue advanced degrees related to science, technology, engineering and math. Empirical research has found that over 80% of students who participated in undergraduate research experiences planned to pursue post-graduate or professional education. Undergraduate research has also been shown to improve student’s perception of their own interpersonal skills. Data were collected from a population of undergraduate student researchers at a Northeastern, agricultural and technical college. Utilizing qualitative research methods, participants were asked about their experience participating in research activities as undergraduates. The population for the study included 6 undergraduate student researchers from the college’s department of animal science. All student researchers were white and female. After appropriate coding and data analysis techniques were implemented, several themes emerged. These themes included: teamwork, scholarship, engagement in content, time management, and perceived benefits related to the hands-on experience. Participants expressed

positive attitudes toward their experience with research and were encouraging of other undergraduates to engage in a learning experience in which they found substantive value. Participants also expressed beliefs that their research experiences would aide in their acceptance to graduate or professional school.

050

Innovations for Agriculture: Prototyping Solutions to Sustainability Challenges

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Tackling sustainability challenges in our agricultural system will require significant creativity and innovation. Students educated at our land-grant institutions should be prepared to identify problems in agriculture, develop innovative solutions, and assess the feasibility and potential impact of those solutions. Unfortunately, few classes are specifically designed to equip students with the skills to become innovators in agriculture. To address this need, a new course was developed to introduce students to a framework (rooted in design thinking) for defining challenges, assessing status quo approaches to challenges, and developing innovative products or technologies to better address those challenges. Students can research, develop, prototype, test, and pitch an agricultural innovation of their own creation. The course was offered for the first time in fall 2017, and prototype innovations included: 1) a low-tech cattle tag for smallholder ranchers; 2) a grocery/cooking mobile app for college students; 3) a direct mail, reusable grocery bag for marketing local foods; and 4) a community-based decision-making tool for international aid organizations. Students in this inaugural cohort loved to discuss and design prototypes but found prototype creation and testing more difficult. To address this challenge, future course offerings will include laboratory exercises that leverage resources at the Nebraska Innovation Studio Maker Space and introduce them to appropriate prototype testing methods. This course will be especially useful to

students in entrepreneurship who are often excited about starting their own business but are still searching for a product or technology to build that business around.

051

Developing a Holistic Framework for Learning Outcomes Assessment in Plant Propagation

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Learning outcomes assessment is an important course evaluation tool that informs what students learned relative to what instructors taught. Four different approaches to learning outcomes assessment, including exams, quizzes, labs, and student surveys, were compared in one semester of a plant propagation course at the University of Nebraska-Lincoln and results were interpreted within the cognitive framework of Bloom's Taxonomy. Correlation analysis indicated no relationship among results from the four assessments for each of 14 learning outcomes, which suggests information gathered by each assessment was not duplicative. Direct, objective assessments (exams and quizzes) were most useful for discriminating between successful and problematic learning outcomes but interpreted alone these may underestimate student learning given their high-stakes nature. Indirect assessment of student learning (knowledge survey) was the least effective tool for identifying instructional weaknesses, and as a result may overestimate successful learning outcomes. Assessment performance scores decreased, and variability increased with increasing Bloom's level; misalignment between what was taught and what was assessed may explain anomalous cases of low assessment scores. Overall, results of this case study demonstrate the need for a holistic assessment strategy that includes a diversity of evidence interpreted within a cognitive framework for more accurate assessment of learning outcomes.

055

Science Integration and Inquiry-Based Learning in Agriscience Teacher Preparation

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Integrating science and inquiry-based learning into classrooms is a common trend in education. This study specifically focused on pre-service teachers' experiences of applying an inquiry-based learning approach to integrate science into agriscience classrooms. Two focus groups (n=12, n=14) at the University of Nebraska were used to collect data. The constant comparative method was used to analyze the data. The following six themes emerged: (a) scientific inquiry-based learning is a process, (b) critical thinking and problem-solving, (c) age, skill level and prior knowledge, (d) time considerations, (e) student versus teacher led, and (f) trainings and pre-made lessons. The pre-service teachers in the focus groups had positive attitudes towards using inquiry-based learning in their teaching. The process of scientific inquiry-based learning aligns with critical thinking and problem-solving skills. The pre-service teachers recognized that age, skill level, and students' prior knowledge are factors to be considered prior to implementing inquiry-based lessons. Inquiry-based lessons can be time intensive – in both planning and utilization. Training teachers to apply pre-made lessons and providing materials could assist effectiveness of the teacher. Meanwhile, teachers must determine the balance between teacher and student-led time. Inquiry-based teaching was seen to effectively fulfill the increasing need for science integration in the agriscience classroom. By understanding the experiences of pre-service teachers, we are better able to design courses and professional development to enhance pre-

service and in-service teachers' ability to integrate science into agriscience classrooms using inquiry-based learning.

065

Great Expectations or Pride and Prejudice: A Survey of Student Perception

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In order to excel at teaching, one must first understand the thought process of those being taught. Today, our students have a number of inherent expectations that are rarely voiced, yet clearly anticipated. The objective of this survey was to determine how students' viewpoints changed on what they expected of courses as they progressed through their academic career. To accomplish this, students (n=406) in animal science courses completed a survey recording their demographic information and answered questions that regarding their expectations as students including what they expected of courses in their degree program. Distributions of responses were compared using chi-squared analysis with pairwise comparisons to determine differences between student classifications. However, because multiple pairwise comparisons can lead to errors in analysis, comparisons were limited to the change during an undergraduate degree (Freshmen to Senior) and entering Graduate school (Senior to Grad). Of the six questions pertaining to student course expectations, five were found to have changes in student viewpoint by classification. These questions asked student viewpoints on the fairness of multiple tests in the same week, providing extra credit, types of exams, accepting late work, and spelling and grammar. In all cases, a change ($P < 0.05$) was detected from Seniors to Grad. These data illustrate that there is a distinct change in the mindset of students after they graduate, and the expectations in a senior course are very different than those of a graduate level course.

066

Evaluation of Student Performance Based on Instructional Technologies: PowerPoint v. Traditional Chalkboard

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A regression analysis was used to evaluate whether students perform better when taught using PowerPoint instructional technology or traditional lecture and chalkboard teaching. The data were collected from the Principles of Agricultural Economics class for ten semesters, five of which were taught using lecture and chalkboard and five using only PowerPoint. All these classes were taught by the same instructor during the fall and spring semesters. The study included 443 observations, of which 221 were males and 222 females. It is a required class in the Department of Agriculture and consists of primarily freshman and sophomore students. A student's performance was measured as the percentage score for the semester based on exams, quizzes, assignments, and attendance. In the regression model, the percentage score was a function of teaching methodology, semester, gender, and absences where all dependent variables except absences were 0, 1 binary variable indicating PowerPoint or lecture and chalkboard, fall or spring semester, and male or female student, respectively. Absences indicated total number of classes missed during the semester. We assumed that students will (1) perform better in the spring semester because they got acclimated to the college environment during their previous fall semester or the freshman year and (2) retain and learn more because PowerPoint with its visuals will help them understand better the textbook materials. However, the results show that the only significant variable in explaining the difference in student performance was "absences". Since PowerPoint materials were posted, students missed more classes and scored lower grades.

069

Social Media: A Useful Tool for Advertising a Cattle Sale?

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Social media is an outlet that has become a prominent component of the marketing industry. Businesses rely on social media marketing to reach a vast pool of customers. The agriculture industry has navigated toward social media marketing of livestock, products, and equipment. The Purple Premium Cattle Sale, hosted by an advanced beef cattle class at Stephen F. Austin State University, uses social media marketing to attract buyers and consignors. Students learn to photograph livestock, write footnotes, and create social media posts that market the cattle and sale. Through social media marketing, the Purple Premium Sale has grown in followers, post interactions and shares, and sale attendance from year to year. The purpose of this study was to determine if social media is an effective tool for advertising a cattle sale hosted by students. Survey responses indicate that attendees were informed about the sale by word of mouth (60.71%) compared to social media (8.93%). Attendees were 45 years and older (75%) and greater than 75% had been in the cattle business for 6 or more years. Forty percent of attendees surveyed had only attended the sale in 2017. First year attendees also learned about the sale through word of mouth (40.9%) compared to social media (13.63%). Overall, social media was not as successful at marketing the sale to target audience members as word of mouth.

074

Agripharmatech Program Certificates: Transfer and Workforce Pathways from High School to Associate and Bachelor's Degrees

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In AY 17–18, the Early College (EC) - Windward Community College's (WCC) Certificate of Competence in Agripharmatech: Plant-Food Production and Technology (CO PFPaT, 9 credits) partnership was expanded to Kailua, Kamehameha and Hakipu'u high schools. An interdepartmental course alignment between CO PFPaT and Hi'ilaniwai Foodservice Innovations Training (HiFIT) ServSafe program was formalized. The objectives of these projects are to produce workforce-ready and/or agripreneurs, as well as to prepare CO PFPaT graduates for transfer to pursue Certificates of Achievement (CA) in Agripharmatech (31-32 credits) and Associate in Arts (AA) in Liberal Arts or Associate in Science (AS) in Natural Sciences (60 credits) at WCC. The 2+2 course alignment/articulation was also developed with departments at the University of Hawaii, Manoa to provide CA, AA and AS graduates for a fluid transfer to pursue bachelor's degrees in agribiosciences. Survey results indicate that among 11 EC Kailua-CO graduates, 64% are STEM and 27% are Business majors, and 9% enter the workforce. Out of 22 EC Kamehameha-CO graduates, 32% major in STEM, 37% in Arts and Humanities, 21% in Social Sciences and Business, and 11% enter the workforce. Among the 14 EC Hakipu'u-CO graduates, 67% major in biology, environmental sciences and nursing, 33 enter the workforce. Data for HiFIT ServSafe-certified students will be available in Spring 2019. Overall, 45% of ECHS-CO graduates transferred to WCC and are pursuing CA Agripharmatech as well as AA/AS degrees. The other 45% of graduates transferred to mainland universities, and 10% entered the workforce.

076

Tarleton State University Graduate Students' Perceptions of Genetically Modified Organisms

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Genetically modified organisms (GMOs) are a controversial topic and many individuals have different thoughts on the subject. GMOs are food produced from any plant or animal genetically altered during production using the modern techniques of gene technology. As of 2017, 10 genetically modified crops are available for production and are being grown for increased drought tolerance, insect resistance, herbicide tolerance, virus/fungal resistance and product qualities such as flavor and nutrition. The specific objectives of this study were to: describe the sample based on specific demographic variables; describe the samples knowledge and perceptions of GMOs; determine if there is a statistically significant relationship between gender and GMO knowledge and perceptions; and determine if there is a statistically significant relationship between age and GMO knowledge and perceptions. The research focused on graduate students enrolled at Tarleton State University. The survey was developed and sent out using the Qualtrics survey creator and was distributed through students' e-mail accounts. Once all survey responses were completed, the instrument reliability, validity, regression, and non-response error were calculated. Results for the specific objectives were calculated and statistically significant relationships were found. Most participants surveyed were females who have never lived on a farm or ranch and were between 22 and 25 years old. Participants tended to rate their level of scientific knowledge as average and tended to agree GMOs have a positive effect on world hunger, with a more negative effect reflected on family farms.

077

How Using Scenarios Can Create a Dynamic Learning Environment

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In order to solve complex problems of a global nature, students must be able to think critically about them. Thinking is a natural process and can often be biased, distorted, partial, uninformed and potentially prejudiced; excellence in thought must be cultivated. The challenges for instructors to build capacity for critical thinking then must become two-fold, instructors must appreciate the natural critical thinking style of students, but also the impact of the extent to which specific strategies are utilized to encourage critical thinking. One method for accomplishing this is the use of scenario-based learning. Scenarios are similar to case studies, but much more complex and include many more decision points. The detailed process provided by Wilson and Ralston (2006) for developing and using scenarios provides a much more fertile foundation for developing and using critical thinking skill. Their process involves 18 steps, with each step in this process providing a critical point of added value and exposed mental models and assumptions. Through the Global Thinking Academy, faculty were provided the framework for critical thinking pedagogy, teaching complex issues (climate change and food security), and the creation of scenarios. This session will share the experiences of faculty who created the Global Thinking Academy and the impacts of the GTA experience on participants' creation and implementation of scenarios in the classroom.

080

Using Pre- and Post-Course Assessments to Evaluate Student Learning in Animal Welfare Assessment Courses

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As the public and state legislators push for welfare-friendly animal products, future animal scientists need to be trained in animal welfare assessment. At Michigan State University, students can enroll in a 1-credit experiential course, Introduction to Animal Welfare Assessment. This class is a prerequisite for, but can be taken concurrently with, Animal Welfare Judging, a 1-credit course that prepares students to participate in the annual intercollegiate welfare judging competition. There were 17 students enrolled in ANS 200E, with 9 students enrolled solely in this course (Intro), 3 students concurrently enrolled in both courses that did not compete in the competition (No Comp), and 5 students concurrently enrolled in both courses that did compete in the competition (Comp). All students were given 10 question pre- and post-course assessments with questions relevant to student learning outcomes. The averages for the pre-course assessment for Intro, No Comp, and Comp were 56%, 47%, and 63%, respectively. The averages for the post-course assessment were 79%, 86%, and 93%, respectively. The average improvements between assessments were 23%, 27%, and 24%, respectively. These results show that all students gained knowledge in scientific assessment of animal welfare from enrolling in these courses. Students competing in the judging competition had overall higher assessment scores but competing did not lead to greater overall improvement. These results show that a 1-credit course can be an effective way to begin training students in animal welfare assessment without major curriculum changes. Implementing similar courses would benefit students and prepare them for future careers.

082

Everything but the Kitchen Sink: Teaching Urban Ecosystem Services without Lectures

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An upper-level course was launched in Spring 2017 (n=10) and taught again in Spring 2018 (n=10), to introduce graduate and advanced undergraduate students to theoretical and applied approaches in urban ecosystem services. In this course, various active learning techniques were used including: gaming/role playing, Immediate Feedback Assessment Techniques (IF AT), small and large group discussions, pre-lecture assignments including guided worksheets, student-led instruction, mini-projects, and end-of-semester videos using Purdue's Video Express rooms. The course was taught without lectures and with a flexible structure. Of particular interest was (1) whether the "lecture free" approach would be well received and whether students preferred this approach to a traditional lecture format; (2) Whether the active learning approaches used would be "liked" by the students and if they perceived that each approach aided in their learning; and (3) whether the use of new "active learning" classroom space was preferred to traditional spaces. Anonymous assessments using a Likert scale were administered to assess students' perception of the active learning format (and space) of the course, their learning experience and perceived achievement, and recommendations for course improvement. Overall, the students enjoyed the activities, reported that the activities contributed to their learning, and preferred the active learning space. While most students preferred the free "lecture free" format, some recommended that a few lectures be added to the course rotation.

083

Snap to the Future: Developing Career-Ready Skills in College Graduates

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Educators in colleges and universities in agricultural, food, and life sciences are constantly looking for innovative ways to prepare entry-level employees. Preparing career-ready skills requires faculty to consider the generational needs of students while advancing their skills to address employers' desires. Employers identify accountability and commitment as two primary soft-skills desired when hiring new employees. Using experiential learning, our agricultural publications course is treated like a part-time job where students are trusted to complete requirements expected of them, in lecture and outside of scheduled class time, as they would in an actual career. Based on the United States Department of Education federal mandate, students are expected to complete nearly 135 hours working on course-related activities outside of class for a three-credit course, which is equivalent to nearly 3.5 work weeks. We believe one of the best ways to teach accountability is to help students understand their commitment to the time they invest outside of scheduled class time. To accomplish this, we have incorporated the use of a personalized Snapcode through Snapchat for students to scan each time they work outside of class that links to a Google Form with a course timesheet. The timesheet allows students to "check-in" and "check-out" when they work on a course project. Documenting the average time each student invests in coursework outside of scheduled class time will help students learn time management and give our team a better understanding of the course's effectiveness in training career-ready skills to best serve students and future employers.

085

Nurturing Engagement: Conducting Formative Assessments of Student Learning with Plickers

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Formative assessments are useful to teachers as a method to gauge student learning, plan for future instruction, and receive feedback from groups. The use of classroom response systems (CRS) can assist in gathering instant feedback to a variety of questions and therefore serve as a tool for formative assessment. Plickers is one such type of CRS for classroom application that does not require students to use a device, but rather hold up a piece of paper. Plickers were used in a course at Texas Tech University in Spring 2017 as a way to gather feedback and stimulate discussion. During the semester, the cards were integrated in five specific class sessions and multiple questions were asked during each. At the end of the semester, students were asked to provide anonymous responses as to whether they enjoyed using the Plickers in class and if they should be used in the future. The responses were overwhelmingly positive as demonstrated in the following quotes: Loved the Plickers! They were a fun thing to do throughout the class. I loved them, and I liked looking at the end of results when we were done. I wish we used them more. Beyond this class, teacher educators have also demonstrated how Plickers could be effectively integrated in the high school classroom. Pre-service high school teachers have used them in situations where technology integration is difficult. As the students suggested, Plickers will be used more often in the post-secondary level course and will be integrated in additional courses.

089

Flipping Apparel Construction Class Inside Out

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Equipping novice seamstresses with the fundamentals of apparel construction can be challenging. The traditional teaching method consisted of step-by-step demonstrations considered the “lecture” in which students observed. This method did not allow learners to actively engage leaving many unsure about proper techniques. Teaching apparel construction requires students to “do” in order to develop basic skills. The flipped pedagogic approach incorporates active learning with technology while allowing critical class time for skill development and problem solving. The purpose of the presentation is to explain the steps involved in developing a flipped apparel construction course. Based on two years of practice, organization of course content is necessary. The steps to the flipped classroom approach are: setting daily learning objectives and construction goals, developing or identifying teaching videos and related resources, organizing the course site, assigning daily homework, and maximizing class time for apparel construction. This method is an in-class time saver. Outcomes observed include: sufficient knowledge gained prior to class from completed homework, increased student confidence with greater independence, students take ownership of their own learning and video resources bridge reading and application. In conclusion, the flipped classroom has been found to engage students, improve the learning experience, and focus on skill development. The instructor must be organized, embrace technology and willing to invest the initial time to develop the course. Construction students will exhibit greater confidence and abilities needed for apparel construction success.

091

From the Field to the Forest: Engaging Students in a Discussion about Soils

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From Spring 2017 to Spring 2018, we integrated a series of active learning techniques into our soil science (n=430) and forest soils (n=70) courses. These activities were tied to the course learning objectives and included: group drawing exercises (e.g., the nitrogen and water cycles, soil moisture instruments, and clay minerals); iterative worksheets (e.g., micro/macro nutrients, calculations); demonstrations; games (e.g., matching and trivia with electronic buzzers); and the use of iClickers and the immediate feedback assessment technique in lectures. Multi-colored pens were used to identify individual (blue), group (green), and class (red) responses/contributions on key in-class activities and quizzes. iClicker questions were used to assess student understanding in lecture. This 3-semester effort was coordinated across 6 lectures, 10 different instructors, and 35 weekly recitation sections. Our goal was to assess student perception about the techniques and whether they felt the new approaches aided in the learning. Anonymous assessments using a Likert scale were administered at the end of each semester to assess students’ perception of the individual exercises/approaches, their learning experience and perceived achievement, and recommendations for course improvement. Overall, the students enjoyed the activities with a higher percentage of students reporting that the activities contributed to their learning, even if they didn’t enjoy them. Differences were noted across instructors and courses but did not change the overall trend.

092

Supplementing Official Course Evaluations

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There is ample evidence that end-of-course evaluations are not good indicators of learning, though they are relied upon as an important indicator of teaching success. The objective of the session is to share nonformal means of evaluating coursework the presenters engage in to provide a fuller view of teaching and learning. This includes visits from peer evaluators and personnel from university centers for teaching and learning, as well as gathering information from students in nonformal evaluations. The focus of the poster is the practice of having students share their unfiltered advice for the next term's students on how to be successful in the class, which adds authenticity to the advice. While the advice helps the next term's students, it has also been useful for understanding what students believe they need to do to be successful and therefore helped the instructors understand what students are paying attention to during the semester. In isolation, none of these measures provides a full view of teaching and learning, but when you combine these elements, along with tracking student progress toward course objectives, you get a fuller understanding of what is going on in the classroom.

093

Applying Cognitive Task Analysis to Professional Horse Judging Practices

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Learning to judge horses often requires the guidance of experts to develop and hone skills in novice practitioners. Developing horse judges gain

experience through many different avenues, be they through youth judging contests or apprenticeship programs with professionals. While strict guidelines and testing procedures are set forth by various equine breed associations, a set standard for procedures that take place in the class of horses is limited to the tracking of the animal, not the approach to animal examination. To expand training and learning practices for trainee judges a cognitive task analysis was performed on ten professionally carded horse judges belonging to American Quarter Horse Association and/or American Paint Horse Association to assess the concepts, processes, and principles they take in order to judge a class. The aforementioned judges have judged for five or more years at a professional level and were interviewed by the researcher to gather the necessary information needed to analyze their practices. Cognitive task analysis determines 1) how do professional equine judges apply training, procedure, and industry standards to a live animal in order to analyze a stock-type halter class? 2) what are the cognitive skills involved in judging a stock-type halter horse? 3) what are the procedural skills involved in judging a stock-type halter horse? This analysis of professional horse judge's practices serves to create a standardized protocol to be used as a training and learning tool in the equine industry.

101

A Novel Approach for Student Debates on Controversial Topics in Agriculture

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It is essential that university-level students be adept at discussing controversial issues from an educated and professional standpoint. Classroom debates serve as a valuable resource for educators to instill such traits in students; concerns exist, however, that debates only reinforce students' existing positions. A new pedagogical method for employing debates in a STEM/Agricultural classroom was investigated with the objective of preparing students to communicate controversial topics and expand content

knowledge, and to determine whether opinions are affected after the assignment. On the first day of class 90 students were administered written surveys (with IRB board exemption) with a Likert scale to respond to statements addressing GMOs, organic food production versus conventional, food safety perceptions, humane treatment of animals in CAFOs, meat consumption, and other controversial topics in modern agriculture. Students were then assigned to a debate team that held the opposite opinion as indicated by the survey. Following the debates, students completed the same survey and response differences were analyzed. Students reported that debating the opposite of their opinion was interesting and broadened their perspectives on the issue. A significant number ($p < \alpha = 0.05$) of students changed their initial opinion in the final survey. Overall, there was a significant shift in consumer confidence in food safety and how their food was grown or raised ($p < \alpha = 0.05$). This pedagogical approach to preparing students to communicate demonstrates that students pre-conceived notions on controversial topics were challenged while expanding student's knowledge base.

103

Longitudinal Recruitment Trends Following University Summer Agriculture Programs for High Schoolers

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Recruiting students for college is vital to the long-term viability of many higher education institutions. Current trends suggest that many students make their college selection earlier in their high school career. Consequently, recruitment strategies have become increasingly competitive as universities compete among smaller pools of students from rural areas. It is important for universities to not only reach students early, but to allow them to experience the university first hand. The University of Tennessee-Martin has worked to develop a unique four-week on campus summer experience, known as the Tennessee Governor's School for Agriculture Sciences (TGSAS) for high

school students who are potentially interested in agriculture as a career choice. Sophomore and junior students are selected from across the state of Tennessee to attend TGSAS based upon potential for leadership and academic success. The program has evolved over the years to include multiple academic credit courses, industry exposure, and training in scientific experimentation. Recruitment results from the program have been mixed since its inception. Historically, the university had limited success recruiting students from across the state. However, many students chose to attend UTM following their TGSAS experience, despite being long distances from home. Responses from student participants indicated that critical thinking skills and subject matter appreciation were enhanced from the experience. Students also indicated that experiential learning was the preferred teaching style and that subject matter was enhanced through individual and team research projects. Overall, the majority of TGSAS participants decide to attend UT-Martin after high school based on their experiences.

106

The Lived Experiences of Governor's School Participants from Varying Demographic Backgrounds

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University summer programs such as specialized camps, short courses, and governor schools have long sought to positively impact a variety of audiences. To inform the design and impact of such programs, university practitioners must measure outcomes to determine program impacts. The University of Tennessee-Martin hosts the Tennessee Governor's School for the Agricultural Sciences (TGSAS) annually for approximately 32 Tennessee high school sophomores and juniors. Students interact with agriculture industry professionals, participate in field experiences, and complete two courses for college credit. This project utilized a bounded case study design to determine the short and long-term impacts of the TGSAS students. Perceived program

impacts were collected from randomly selected participating students with agriculture and non-agriculture backgrounds. Student interviews were conducted prior to TGSAS, during TGSAS, and one year following the TGSAS experience. Fourteen students were originally interviewed with six interviewed one year later. The interviews were transcribed verbatim and analyzed using the constant comparative method. The following themes emerged from the analysis: Agricultural Curiosity, Enhanced Preparation for Furthering Education, Enriched Connections and Networking, Hands-on Learning, and Influential Individuals. All students, regardless of demographic background, found the impacts TGSAS experience to be vital in their education and career decisions. The current study established a baseline of data for tracking TGSAS students to determine long-term program impacts. Recommendations were made to continue collecting data using qualitative and quantitative methods. Recommendations were made that other institutions replicate this process for special programs to understand program impacts.

107

Assessing Professional Development Needs: Improving Teaching and Learning in Agricultural Education

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Twenty-first-century learning requires various forms of teaching to develop student competencies, such as deep mastery of challenging content, critical thinking, complex problem-solving, effective communication and collaboration, and self-direction. Effective professional development is needed to help teachers learn and refine the pedagogies required to teach these skills. To provide the most appropriate and advanced professional development needs of Kentucky agricul-

tural educators, a needs assessment was conducted to collect information regarding the teachers' perceived confidence and importance of technical agriculture education content areas, pedagogical skills, and management of a complete agricultural education program. For the purpose of this study, a census was conducted with a frame of 239 agricultural education teachers with a response rate of 42.6%. Mean Weighted Discrepancy Scores to indicate the difference in teachers' perceived confidence and importance on items were calculated and analyzed. Findings indicate opportunity for professional development in; preparing FFA proficiency award applications, conducting needs assessments, teaching critical thinking and creativity, integrating current advances in agriculture technology into curriculum, biotechnology content knowledge, and food products, processing, operations, and management content knowledge. The findings will be useful to teacher educators as well as teacher preparation programs within the United States. Several studies have shown that professional development that addresses discipline-specific concepts and skills improve teacher practice, as well as student learning. Further examination of the most effective mode of dissemination for Kentucky agriculture teachers and designing rigorous and relevant training in the identified areas is imperative to the success of teachers and students.

110

Secondary Agricultural Teacher Preparation in U.S. Higher Education: Historical Perspectives on Capacity and Production

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Agricultural teacher education has occurred in the United States in higher education since the early 1900s. A supply of highly qualified school-based agriculture teachers is critical to sustaining school-based agricultural education. There is a continued shortage of school-based agricultural educators in the United States. Since 1965, the American Association for Agricultural Education (AAAE) has strived to assist with this issue by providing reliable data for decision makers and stakeholders. Programs involved in agricultural education at the post-secondary level in the United States are at historic highs; however, quantity and composition of full time employment positions in post-secondary agricultural education is changing. Most of agricultural education faculty, agricultural education undergraduate academic programs and agricultural education graduate academic programs are affiliated with colleges of agriculture. Academic opportunities in agricultural education at both the undergraduate level and graduate level are unevenly available across the nation. Further studies are recommended to describe the activities and workload of post-secondary agricultural education faculty involved in agriculture teacher preparation. While the quantity of program completers is not at historic highs, trends are positive. The highest producing 1/3 of agricultural teacher licensure program completers programs produced 2/3rds (n=1452) of total secondary school-based agricultural education candidates from 2014-2016.

Over the past three years, approximately 72% of program completers accepted a position in school-based agricultural education. Further research is needed to explore the growing gender disparity and in non-traditionally or alternatively certified teachers.

111

Revisiting a Project: #TeachAgChat's Growth Since 2015

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In 2015, pre-service agricultural teacher candidates created #TeachAgChat as multitudes of other chats are organized around different educational subject areas, but one did not exist for agricultural education; thus, presenting an opportunity for student development and professional service. The primary goal was to utilize Twitter, a social media platform, to provide opportunity for inclusively connecting geographically disparate individuals for productive dialogue. A sense of isolation and disconnection is a major threat to retention of secondary school-based agricultural educators. Collaborative web technologies can help cultivate an online community of practices for professional development. Since that time, series have been curated and hosted by wide ranging entities. Data from distinct chat sessions facilitated by teacher candidates and other groups was gathered using advanced social media monitoring software Keyhole. Analysis of the tweets, including users, overall number of tweets, level and type of participation was conducted. #TeachAgChat has continued beyond the single classroom assignment with different stakeholder groups hosting regular bi-weekly chats. Best practices for integration were collected from participant interviews. Future conversations on utilizing the experience to grow digital leadership from digital citizenship as well the expansion of professional learning networks is anticipated.

113

#TeachAgTalks: Fighting Email Deluge with Podcasts

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A podcast is a digital audio file made available for downloading to a computer or mobile device, which can be subscribed to be received automatically. At least 112 million Americans have listened to podcasts and according to the Pew Internet Research Center, there has been substantial increase since 2006 with four-in-ten Americans ages 12 or older have listened to a podcast in 2017. The vast majority of Americans – 95% - own a cellphone with 77% owning Smartphones. In 2017, the total number of business and consumer emails sent and received per day reached over 269 billion. With a primary stakeholder group of secondary agriculture teachers suffering from a deluge of emails, a more effective communication medium was desired. An undergraduate student worker (Wildlife and Fisheries Science Management) investigated, designed, and published #TeachAgTalks as a weekly episode of less than 10 minutes to highlight a state-wide weekly email listserv blast. Current students in the major and key stakeholders at significant program events were interviewed and included in the podcast. Utilizing less than \$100 in equipment and free online software, the student produced episodes for subscription on common podcast catchers. Challenges overcome include gaining familiarity with recording process and post-production process. Work-flow had to be analyzed to meet production demands for a weekly podcast. Best practices and approaches will be reviewed as well as plans for future investigations.

115

Exploring Academic Advising through Skills Leadership & Growth Mindset

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Advisors play a critical and empirically supported role in encouraging increased academic success, capacity to establish campus voice, and persistence to graduate among students they mentor. Combining the skills-based model of leadership with the concept of fixed mindset (the belief that talents and skills are innate) vs. growth mindset (the belief that talents can be developed) allows advisors to better understand their students' preferences and talents and encourage their development throughout effective praise. Specifically, the skills-based approach to leadership prepares advisors to better their understanding of students' approaches to problem solving, social judgment, knowledge building, and career/environmental influences. By identifying students' skills and strengths, advisors can apply the concept of fixed versus growth mindset to offer specific and meaningful praise that enhances students' desire to embrace growth-facilitating experiences and their self-concept. A workshop was conducted at a land-grant university with 60 participants that trained advisors in integrating the skills approach to leadership and the fixed vs. growth mindset to create an integrative and individualized advising experience. Results within this initial research of one advising network showed increased cognition of language use, advising methods, and a range of reactions, expectations, and connections to this advising framework that are relevant to all, especially those who work with students.

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Agricultural Students' Perceptions of Being Taught with Curriculum for Agricultural Science and Education (CASE)

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Agricultural educators utilize Career and Technical Education (CTE) to aid students in developing knowledge and skills that will help them become successfully employed individuals within the agricultural industry making CTE driven by workforce needs. Curriculum for Agricultural Science and Education (CASE) was created in 2007 by the National Council for Agriculture Education and allows students to obtain hands-on experiences (CASE lesson development, 2012). The purpose of this study was to determine the students' perceptions of CASE curriculum to understand the subject matter being taught; understand the teaching methods being utilized; and describe the classroom facilities used in delivering the curriculum. The theoretical framework used for this study was Leagans' Major Elements in a Teaching-Learning Situation (n.d.). Researchers posted flyers in a collegiate agricultural orientation course to obtain participants. From respondents to the flyer, freshman and transfer students who took CASE Curriculum courses in high school were selected. Several themes emerged within the focus group. CASE courses were very student-centered and focused on hands-on learning. Students expressed their teachers taught CASE in several different ways. Students indicated the challenges they experienced were with equipment and instructions that were lengthy and wordy. The curriculum had a good balance of science and was easily relatable to agriculture. Overall, students involved in this focus group were very supportive of the hands-on experiences that the CASE curriculum incorporated into classrooms. Future research should be conducted with a larger audience in multiple high school CASE certified programs across the country.

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State Wide Self-Assessment of General Program Standards for Agricultural Education

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To ensure high school agricultural education programs are of quality, the Iowa Council in Agricultural Education created standards to measure the nature of different programs in Iowa. These standards were adopted in 1991, revised in 2000, and then printed in 2001. Standards were created to aid in identifying strengths and weakness in the educational program ("Guidelines," 2001). The Iowa Council on Agricultural Education (ICAE) has never evaluated these standards. The purpose of this study was to investigate the components of a quality agricultural education program in Iowa by identifying the extent to which general program standards, FFA Chapter activity standards, and Supervised Agricultural Experience standards (SAE) were met. Dillman, Smyth, and Christian's (2009) tailored design method was used to develop the electronic survey instrument and the data collection procedures. A personalized email with the link to the survey was sent to all agricultural teachers in Iowa through Qualtrics and three reminder emails were sent to nonrespondents over a three-week period. From the 27 standards in the FFA area, only one standard was reported with less than 50% of the programs meeting or exceeding the standard. Of the standards in the SAE area, 12 of the 17 were met or exceeded by more than 50% of the programs in Iowa. Many educators reported their programs were exceeding the standards set by the ICAE. From the findings, many agricultural education programs are not using FFA Alumni to assist in the instructional programing. In addition, teachers indicated a full report of activities were not presented to the advisory committee or school administrators.

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Integrating Service Learning into the Agriculture Classroom

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Service learning demonstrates that students will become effective learners and better citizens if existing course programs integrate community outreach into the curriculum. It is very easy to confuse service learning with community service, but community service programs are often finite and are usually chosen and led by other people besides the participants. Service learning programs are connected to the curriculum, involve the development of partnerships, allow for student choice, require reflection, attempt to solve real-life problems, and provide for program assessment. This study looks at how one university has implemented service learning in two separate courses in the agricultural curriculum; an animal science course and a leadership course. The animal science course involves students working with county 4-H livestock members. The university students prepare and lead workshops for the members that involve major course concepts such as nutrition, equipment, breeds, fitting and showing, meat quality, animal health, and parasite control. The leadership course involves students pairing up with a church to address a capital need in a rural area. The students meet with the pastor to develop a proposal, using the Boy Scout of America Eagle Scout project book as a guideline for implementation. The service learning components of both classes have been very effective at demonstrating personal, social, and civic responsibility for the participating students. The service learning opportunities have become a model for the university as the administration and faculty seek ways to integrate service learning into the coursework for other disciplines.

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Strategies to Developing Graduate Student Career Preparation for the Academy and Beyond

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Many graduate students often graduate feeling unprepared for their future careers. Engaging in specific activities that encourage career preparedness is crucial to succeeding post-graduation, whether the students pursue careers in academia or industry. Graduate students' advisors play a crucial role in their students' career preparation. This presentation will highlight an innovative approach to teaching, mentoring, advising, and professional and career development for graduate students. Specifically, learning activities that the graduate students engaged in, as well as a reflection from the students and the advisor will be shared. Using innovative learning experiences, graduate students engaged in activities such as op-ed writing, course syllabi development, job shadowing, job announcement reviews, and other scholarly product development assignments. These learning experiences prepared students to be more competitive in careers as researchers, faculty, administration, extension educators, and non-profit organizations. Research indicates that graduate students who experience doctoral socialization, positive student-faculty relationships, student engagement, and peer interaction tend to graduate at higher rates than students who do not. The learning experiences helped graduate students to develop and improve on professional dispositions; e.g., written communication, problem-solving, leadership skills, and a growth mindset. Strategies to enhance professional dispositions include producing scholarly outputs, contributing to the submission of grants, engaging in scholarly discussions with peers and faculty, and leading projects to completion. Taking a proactive approach to graduate student career development helped graduate students gain a better understanding of the professional dispo-

sitions required for career success, as well as enhance personal and professional career development.

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Cloverbud and Grow with Mini 4-H Camp

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4-H is designed for youth grades three through twelve. Adolescents complete experiential learning projects in health, science, citizenship, and agriculture while receiving guidance from adult volunteers. To extend 4-H to all K-12, Cooperative Extension Services offers Mini 4-H. Mini 4-H was designed to help children cultivate friendships, to explore the way things work, and to practice working together. Because Mini 4-H participants are new to the 4-H program, it is important to provide the necessary information to be successful. Camp can prepare Mini 4-H'ers to excel in their introductory years of 4-H by providing an overview of the program, explaining the multitude of benefits of participating in the early years, and a head start on developing important interpersonal skills. Camp activities focus on the four pillars of the 4-H Pledge – Head, Heart, Hands, and Health. The activities provide background knowledge of 4-H and coincide with specific Mini 4-H projects. For example, the activity for “Head” is educational, interactive, and engaged youth in critical thinking and problem solving; “Hands” focuses on building and creating; the “Heart” activity emphasizes teamwork and developing interpersonal skills; “Health” concentrates on healthy living including diet, exercise, and overall wellness. An outcome of Mini 4-H camp is that youth receive an explanation of the projects available, the exhibition options, and the opportunity to begin working on projects for the upcoming 4-H fair. This poster will highlight an alternative way of providing information to new Mini 4-H participants by utilizing a student-centered, experiential learning model for instruction.

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Cultivating Content Knowledge through a High Impact Learning Opportunity

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High impact learning opportunities (HILO) are activities that help students learn, make connections, and participate in critical thinking at a deeper level than typical classroom instruction. Agricultural education student interns will soon be entering classrooms across the state and nation where they will educate their own students about the agricultural industry. Participating in a HILO will strengthen and diversify the knowledge of teachers regardless of their agricultural background. This specific project, funded by the Kansas Corn Commission, allowed for the application of corn-focused topics and issues outside the traditional classroom. Nineteen student interns and four faculty members explored the corn industry in Kansas during a two-day HILO in spring 2017. The stops were planned to show the progression of corn through the production chain (farm, ethanol plant, feedlot). Students were asked to reflect and respond to reflection questions at the end of each day. They enjoyed the experience and identified ways to utilize the information in their future classroom. Students commented that the experience helped them learn to “go out and explore, see other ag industry; show students the diversity of agriculture with hands-on tours;” and “utilize the resources around you.” The HILO was very successful, but more time for reflection and debriefing at the end of each day to “unpack” their experiences and observations is needed. The HILO will be repeated each spring, as long as funding is available, to help interns learn how to plan such experiences for their own students.

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The Grass is Greener: Student Perceptions of an Agronomic Experiential Learning Activity

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The purpose of this survey was to measure the impact of a field research project on students' content knowledge and hands-on skills. During the 16-week Forage and Weed Management course at the University of Mount Olive, students worked in teams of two to three to prepare, plant and manage one-acre plots that compared establishment methods and forage varieties. Students (n=14) completed pre- and post- activity surveys (range of 1 to 5; 5 representing subject material expert and 1 representing no experience with subject material). Students worked together to decide which field preparation treatments and forages to compare. Every student participated in the calibration and operation of the seed drill, herbicide sprayer and fertilizer spreader. At the end of the project the students measured crop yields and compiled results in a pamphlet which they distributed during a simulated "field day". The three highest areas of perceived improvement due to the experiential learning activity were land preparation for forage planting (increase from 2.6 to 4.6), equipment calibration (increase from 2.4 to 4.0) and knowledge about the different species of forages (increase from 2.8 to 4.4). Reflective feedback via a Likert-type scale indicated that 100% of the students either strongly agreed or agreed that the project helped them retain the material presented in lecture and improved their confidence in planting and managing forages. They also reported an improvement in written and oral communication skills. Survey results demonstrate hands-on learning experiences improved the students' perceived increase in subject material content and skillset.

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Collaborating to Recruit the Future: Pre-College Program Development, Assessment, and Impact

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The Offices of Academic and Multicultural Programs within Purdue University's College of Agriculture have created a collaboration to assist in multi-faceted pre-college program improvement. The Pre-College Molecular Agriculture Summer Institute (MASI), and the Purdue Agribusiness Science Academy (PASA) are both programs hosted by Purdue Agriculture staff and open to high school students interested in communicating the STEM of agriculture. Collaborating on program initiatives led to a streamlined communication process for teachers, educators, and adult leaders who may see potential in the youth of their communities. While the programs are different in their logistics and outline, their motivation and pedagogy are quite parallel. For this reason, a common pre- and post-test assessment was implemented to measure perceptions of agriculture and overall program evaluation. This evaluation assists coordinators in gauging their programs' abilities in improving perceptions and increasing awareness of the breadth and diversity of agriculture. While the programs' main objectives are to increase overall awareness of STEM in agriculture, each program has found populations of students applying to Purdue University. Pre-College MASI has had 47 participants in 3 years. With 22 participants now college-age, 18 (81.8%) applied to Purdue and 15 (68.2%) are now enrolled. PASA has had 137 students in 5 years (not all seniors), with 30 (21.9%) students applying into Purdue. The team plans to continue assessing the programs to build their survey sample size, while continuing to adjust program contents and tracking students into future STEM related majors and careers.

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Lighting the Fire: Reflection of a Prescribed Burn Experiential Learning Opportunity

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Experiential learning is a well-recognized and highly effective teaching method. Kolb's Experiential Learning Model consists of four parts: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Students (n=22) enrolled in Introduction to Wildlife Habitat Management (WOEM 207) at Kansas State University participated in a prescribed fire learning opportunity on February 11, 2017. Qualitative methods were utilized to collect and analyze the findings. Students completed a pre and post reflection activity to assess the experience. Twenty-two students participated in the prescribed burning lab and completed the reflection activity. Most participants were freshmen and sophomores, with an average age of 20.25 years old (range: 18-29). Seven research objectives were utilized to investigate results, and themes emerged connected to each objective. Students shared their previous experience with prescribed burns (not much), learning expectations (best practices), and feelings (excited and nervous) before participating in the lab. The remaining research objectives evaluated their experience during and their learning from the experience. Students enjoyed the lab (exciting), learned a great deal (wind direction is very important), changed their perceptions of the process (many things to plan for), and provided advice for future prescribed burning experiences (more time on required equipment). Recommendations for the future include offering more experiential learning labs to better connect classroom content to practice. This course was the first in a series intended to prepare students for a career in wildlife management. Additional experiences are being explored to allow students to participate in as many experiential learning opportunities as possible.

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Assessing the Long-Term Benefit of International Agricultural Study Travel Courses

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Iowa State University College of Agriculture and Life Sciences (CALs) has offered international agricultural travel courses since 1963. Students traveled to Europe, Eastern Europe, or Asia on roughly a bi-annual basis. We were interested in learning if agricultural travel courses had an impact on the student-travelers' careers and if the employer and employee perceived any benefits. We sent 335 surveys to students who had participated in a CALs-led international agricultural study travel course between 1964 and 1990. Respondents were asked to rate on a five-point Likert scale to what extent they agreed or disagreed with statements regarding their international study course and career advancement. We also asked with the benefit of hindsight, how student travelers thought personal development and attitudes regarding international awareness and humanitarianism were affected by the international experience. The 132 valid responses indicated with a mean of 3.70 on the five-point scale, significant career advancement with student travel. Most respondents felt their employers valued a global perspective gained in the travel course with a mean of 3.48/5.00. The questions on personal development such as improved self-confidence, broadened attitudes regarding others' customs and beliefs, and increased international interest all had means greater than 3.80/5.00. Overall the survey showed strong impacts and favorable attitudes decades after participation in an international agricultural travel course.

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Non-Major Student Perception of Accuracy of Content about the Loss of Pollinators Varies by Delivery Mode

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Increasing science literacy of non-science majors is a critical goal of science courses taught as part of the general education requirements of most colleges and universities. At Oklahoma State University, Insects and Society is taught to about 800 students each year. In the course, students are taught about both the benefits and harm that insects have caused humans throughout history and into current times. One of the topics covered is colony collapse disorder, a phenomenon that is currently reducing honey bees in North America. We created a Qualtrics survey for students randomly placed into a group based on how they would receive information about CCD. The three treatment groups were 1) watch a short video by Burt's Bees, 2) watch a video lecture by Hoback (instructor of ENTO 2003), or 3) read a fact sheet about threats to bees. A total of 134 male and 131 female students participated. When asked about whether the information was accurate, 38% strongly agreed with the Burt Bee video and the fact sheet, while 60% strongly agreed with the lecture by Hoback. These results suggest that videos are effective communication media and that extension fact sheets prepared for the general population are similar to an advertisement video in perceived scientific accuracy.

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Science Literacy and Public Policy: Preaching Outside the Choir

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The objective of this innovative idea poster is to outline a general education integrative studies

course at Pennsylvania State University. "Science Literacy and Policy in the 21st Century" is a three-hour course that blends topical scientific knowledge with human psychology. For example, one unit of instruction includes content knowledge of the scientific underpinnings of climate change alongside discussion as to why nearly 30% of the national population does not believe the scientific consensus and the associated public policy implications. The course will be piloted during fall of 2018, with an eventual rollout as a named course in the spring of 2019. Weekly topics in the course include: Evolution, GMO's, Pesticides, Hormones, Vaccines, Climate Change, Alternative Energy, Human Psychology, Labeling and Marketing, Consumer Responsibility, Critical Thinking, & Policy Making. Although many scholars have put forth definitions for what it means to be scientifically literate, most agree it involves not only technical subject matter, but the ability to evaluate and interpret scientific evidence, and developing the capacity to engage civically in science matters. Accordingly, this course is designed to provide the foundational content knowledge necessary to understand scientific principles, as well as the experiences and discussion necessary to elicit the skills of a critical thinker and informed consumer. Funding is currently being solicited to align assessments and learning outcomes to the goals of the university wide integrative studies initiative. The course serves as a conduit to engage those outside of the agriculture discipline in communicating the value of science.

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An Exploration of Agricultural Extension Education Graduate Degree Programs in the U.S.

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While educating the public is an important element of schools and universities, Extension's main focus is to serve the educational needs of the public. Quite often, new Extension staff have

content expertise, but need training related to Extension Education. Therefore, there is a need to know which colleges and universities offer graduate Extension Education programs and the requirements of those programs. The purpose of this study was to identify and explore Agricultural Extension Education (AEE) graduate degree programs in the United States to identify universities offering graduate level degrees in Agricultural Extension Education; determine the core courses required by those programs; and to determine the demographics of students enrolled. Program coordinators/department heads within AEE were contacted due to their knowledge and understanding of their program. Of the 17 universities who offer a graduate degree in AEE, 12 offer a Master of Science and 5 offer a specialization or certificate in AEE. Delivery methods ranged from completely online to completely on-campus, or combinations of both. The required number of credits ranged from 30 to 36 and was dependent upon type of final project. Fifteen universities allow students to choose either a creative component or a thesis. Two programs offered a totally course-based degree. Common course work was organized into 10 content areas. These findings offer the opportunity to dialogue about whether these content areas are the appropriate ones. Universities can use these findings to analyze their program and compare it to offerings at other intuitions.

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Teachers Perspectives Regarding Effectiveness of Online Lessons in School-Based Agricultural Education (SBAE)

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Instructional methods have been defined as specific techniques used to present educational content. Researchers have concluded that instructional methods are one of the largest determinants of student attention, learning, and retention. Agricultural education should promote learning

and retention using effective teaching methods to facilitate student understanding. Teachers in today's classroom settings must engage students actively through instructional processes to impact student learning. Because students have identified diverse needs and ways of learning, research regarding methods of instruction for today's secondary professionals of education is extremely important. The purpose of this study was to establish factors influencing the effectiveness of online lessons used in School-Based Agricultural Education. The research objectives for this study were to: (a) identify the types of online lessons used; (b) identify the engagement levels of students while using online lessons; (c) identify the effectiveness of online lessons; and (d) identify teachers' attitudes toward using online lesson. The population for this study consisted of current Texas agricultural science teachers. A random sample resulted in 312 surveys. Conclusions from the study indicated that iCEV was the most common type of online lesson used in Texas. Teachers agreed that online lessons were affective, relevant, correlated to State Standards, and were structured according to learning objectives. For future studies, the researchers recommended to compare the effectiveness levels between iCEV and Instructional Material Services (IMS) online lessons. Future research should also define which factors make online lesson plans effective and engaging for students.

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Problem-Based Ethical Learning in Veterinary Medicine

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Teaching Ethics in the Veterinary Medicine curriculum presents a unique challenge. Students who are accustomed to fact-based science courses are asked once in their academic careers to take a course that is often focused on philosophy and the application of abstract concepts. After years of poor student ratings, the researchers decided to re-design their veterinary ethics

course to adopt a more case-based, learner-centered approach. Students were given clear course learning outcomes and shown how they had direct applicability to their future work as academics and clinicians. The objectives of this course are to encourage first year veterinary students to: 1) Identify their own values, biases and personal beliefs surrounding animals and the human-animal bond and how these biases impact their decision making; 2) Critically evaluate issues, and form logical and ethical arguments and decisions; 3) Demonstrate the ability to navigate difficult conversations with peers when differences in values emerge in discussions. The instructors designed cases involving ethical dilemmas in veterinary medicine, divided the class into small groups (5-6 students/group), and gave their students an ethical decision-making rubric with which to structure their own solution to each ethical conflict. Discussion, dialogue, and creativity were encouraged. This innovative approach led to greater student engagement, higher levels of student satisfaction, and greater success in meeting course objectives (as rated by students).

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Using Concept Maps to Promote Content Integration

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As an ancient Chinese proverb says, "I hear and I forget, I see and I remember, I do and I understand", the idea that active learning improves understanding is not a new concept. Several studies have supported the notion that active learning activities such as problem-solving cases, simulations and student presentations increase not only understanding but also retention of information. Instructors who teach basic science courses to first year veterinary students often find it hard to integrate their course material with clinical, real-life scenarios. We implemented active learning strategies in Veterinary Immunology, a core-course in the first year of the Veterinary Medicine curriculum. This course focuses on the basic mechanisms of veterinary immunology with an

emphasis on protective immunity against infectious diseases and the role of aberrant immune responses in disease. The goal of the course is for students to develop a functional foundation in clinical immunology. We divided the course into six sections with specific learning outcomes. At the end of each section students were given a clinical case and were asked to create a concept map to: integrate new course information with information they had learned in previous sections and to explain the basic immunological mechanisms associated with the given clinical findings. A rubric directly related to learning outcomes was used to assess student performance. By using concept maps, veterinary students were able to apply their knowledge of basic immunology to clinical scenarios, integrate knowledge and demonstrate the complex and interconnected nature of veterinary immunology.

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Improving Data Granularity in the Food and Agricultural Education Information System

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A primary objective of the Food and Agricultural Education Information System (FAEIS) is to provide information for use in planning and coordinating efforts directed toward supporting and strengthening higher education in the food and agricultural sciences. FAEIS currently collects data on student enrollment and degrees awarded disaggregated by Classification of Instructional Programs (CIP) codes, gender and ethnicity from approximately 230 academic institutions. This paper focuses on modeling the educational pipeline and the challenges in capturing an accurate picture of current programs in agriculture. To collect meaningful quantitative data, it is necessary to identify and track evolving programs in a variety of institutional structures as well as demographics over time which is complicated by this growing interdisciplinary world. We compared the number of programs reported to FAEIS in recent years to the

way programs are promoted on institutional websites. There were a total of 75 agriculture related CIPS reported to FAIES from participating institutions which differed significantly from the number of agriculture programs promoted on websites. CIP codes give limited granularity and may fail to capture how programs change over time. We explore the potential of tag-based models to improve the FAIES ability to map degree programs and majors. This innovative approach could provide academic advisors a clearer picture of emerging programs.

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Pre-Class Online Quizzes on Reading Assignments: Student Behavior and Relation with Achievement

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In our junior-and-senior level ruminant nutrition course, students are assigned pre-class readings and online quizzes in preparation of in-class activities. Students are given two attempts at 10 multiple choices generated randomly with resampling from a set of 12 to 18 items for each of 21 quizzes. Our objective was to measure the relationships between online quiz students' behavior and level of achievement. Data were from 74 students who enrolled in 2015, 2016 and 2017. Statistics were obtained using SAS for time-to-deadline (TDL; time of submission in relation to 9:30 am day-of-class deadline), time spent to complete the quiz (TS), quiz score (Qsc), midterm score (Msc), and final exam score (Fsc). Means \pm std for TDL, TS, and Qsc (n=2,299) was 16.5 \pm 16.6 hr, 18.8 \pm 13.3 min, and 0.73 \pm 0.20 for attempt 1 (n=1,362) and 16.6 \pm 16.3 hr, 13.6 \pm 13.1 min, and 0.93 \pm 0.11 for attempt 2 (n=937). On attempt 1, students who took the quizzes further from the deadline spent more time to take them (r=0.106, P<0.0001 between TDL and TS) and obtained better scores (r=0.113, P<0.001 between TDL and Qsc). On attempt 2, students who spent more time to take the quiz obtained better scores (r=0.171, P<0.001 between TS and Qsc). Attempt 1 Qsc for quizzes prior to midterm was

correlated with Msc (r=0.46, P<0.0001) and Fsc (r=0.50, P<0.0001). Neither TS nor Qsc changed during the semester, however, TDL decreased linearly from 19.8 to 13.3 hr between the first and last quiz of the semester, corresponding to submission times of 1:18 pm and 7:42 pm the day before the deadline, respectively.

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Searching for Success: Rethinking Graduate Admissions

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Gaining admission to a graduate program is generally based on student's GRE and undergraduate GPA scores. However, determining how to identify successful students with these measures as a primary input can be difficult at best. The objective of this study is to determine the significance of undergraduate GPA (UGPA) and GRE scores to determine how successful students can be as indicated by Final Graduate GPA (FGPA). To accomplish this, the UGPA, GRE and FGPA scores were collected from students (n=78) over a 7-year period and correlations and simple linear regression were performed to determine the importance of each variable in determining student success. Of the two variables, UGPA had a strong relationship to FGPA (r=0.51) while GRE had a very weak relationship to FGPA (r=0.25). When entered in a linear regression model, UGPA was a significant contributor (P<0.01) to predicting FGPA while GRE scores were not a significant contributor (P=0.50) to predicting FGPA. When only a section of the GRE (Verbal or Quantitative) was analyzed for its relationship to FGPA, Quantitative measures (r=0.25) were better indicators than Verbal measures (r=0.16). With such a heavy weight placed on GRE scores by some universities, one would expect them to be better predictors of success. As it stands, one's past performance (UGPA) is a far better predictor of future success (FGPA).

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Review of Historical Developments in Required Courses in a College of Agriculture

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Undergraduate students enrolled in land-grant institutions across the United States are beneficiaries of progressive decisions of past leaders (e.g., Morrill, Hatch, Smith-Lever, Smith-Hughes Acts). The growing diversity of students in agriculture raises questions about existing tensions between traditions of the past and contemporary relevance of the future. It is imperative for aspiring leaders to comprehend agricultural history to better respond to paralleled current social issues. The objective of this study was to identify the extent agricultural history was integrated into two undergraduate curricula at a Midwestern land-grant university. Required courses of two departments within the College of Agriculture were selected and analyzed. Youth Development and Agriculture Education offers two concentrations and four required courses for all students. Animal Sciences offers six concentrations and five required courses for all students. A keyword search applied to the course syllabi of the nine courses identifying coverage of “history,” “historical,” “social issues,” “acts,” “background” and “policies” revealed that one out of nine required courses specifically discussed history in the applicable context. This syllabus specified a session discussing important events and developments in the history of agriculture, career and technical education, and agricultural education. Others that appeared in the search included inapplicable topics such as the history of animal nutrition. Implications of student lack of historical knowledge are broad and may compromise the understanding of the origin of the assumptions, judgments, and behaviors imbedded in agriculture education.

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Factors Limiting Participation by Secondary Agriculture Teachers in the World Food Prize Purdue Youth Institute

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Global food and nutritional security have emerged as topics of increasing importance with ties to agricultural education, but few Indiana High School Agricultural Education programs have their students participate in associated educational events beyond the classroom. The World Food Prize Purdue Youth Institute (WFPPYI) requires students to look in-depth at food insecurity, composing a five-page paper with their findings and proposing a solution. Select students participate in a two-day event at Purdue University, presenting their reports to a panel of experts. The purpose of this study was to identify factors limiting programs from participating in the WFPPYI. An online survey was distributed to teachers from Indiana FFA Section 1 (n=23). Major factors cited for not participating in the program included lack of program knowledge (52%), time (48%), and lack of comfort teaching research papers (48%) and global food security (43%). Teachers self-rated on a scale of 1-10 at a knowledge level below 5 regarding concepts of global policy (60%), composing a research paper (56%), nutritional security (56%), and food security (48%). Still, teachers found these to be important concepts to teach with 88% identifying food and nutritional security concepts as very important or important. These results show a disconnect between topics these teachers deem important and the comfort level they have in teaching them. Promoting greater involvement in the WFPPYI, and more importantly, making all agriculture teachers comfortable teaching associated topics may require professional development opportunities and more curriculum resources over pertinent topics.

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Using Landlabs to Ground Learning in Practice

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Experiential learning is a hallmark in agricultural education. An undergraduate Agricultural Safety and Health course was used as the context to examine learning through experiential practice. Students were assigned to develop a Job Hazard Analysis (JHA), using a template, as it related to one task at an agriculturally related company. The assignment was scored with a project rubric developed for the assignment. Students were then taken on a tour of the beef facility on campus, under the auspice of creating another JHA for a task conducted regularly at the facility. The new JHA was graded using the same rubric, and descriptive statistics yielded two key results: 1) assignment participation increased from 17 to 19 submissions, and 2) mean scores increased from 4.76 to 5.0. In addition, a Wilcoxon Signed Rank t-test was conducted to examine potential differences between submissions and yielded no statistically significant differences ($t=1.41$, $p=0.157$). However, the practical significance of increased participation and mean score shouldn't go unnoticed. Discourse at the beef facility was focused and productive. Students asked thoughtful questions about options to mitigate hazards and interacted with structures (e.g. alleys and chutes) in a similar manner to cattle handled in the facility. The trend in the data shows these experiences could be valuable to learning safety and hazard content related to large livestock. Further analysis needs to be conducted. Comparative content analysis of assignments could be done to explore contextual impacts of these tours on assignment depth and understanding.

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STEM Academic Days: Increasing STEM Interest with Underrepresented Groups

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The STEM Academic Days was a collaborative effort among secondary, post-secondary, and industry stakeholders with the purpose of encouraging and motivating high school students of underrepresented populations to pursue educational opportunities in Science, Technology, Engineering, and Mathematics (STEM) and to increase their access to higher education. The objectives of this presentation are to provide an overview of this program and share data related to program evaluations and increased enrollment of underrepresented students into STEM post-secondary programs. In 2017, three STEM Academic Days were hosted with a total of 573 high school students in attendance. Each day targeted a specific population: female, African American, and Latino. The students were asked to complete an evaluation at the close of the event, which included demographic information, pre/post interest in STEM and engineering, and favorite aspect of the program. Overall, there was an observable increase in STEM and engineering interest when comparing students' interest before and after the events. Additionally, the largest majority of students reported the STEM Fair (38.2%) and the Campus Tours (33.5%) to be their favorite part of the day. Since 2012, an increased enrollment of female (22.6%), African American (40.7%), and Latino (170.6%) students has been observed in STEM and engineering programs, which coincides with implementation of this program. Over the past five years, the STEM Academic Days have successfully increased STEM and engineering interest in high school students and are thought to be a contributing factor to increased enrollment of underrepresented population in STEM post-secondary programs.

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Real-World Learning through Engaging Students with Farmers and Extension Faculty

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While students of crop production courses get opportunity to experience or see crop management through experiential learning and farmer-field visits, they don't get to know how the extension faculty help tackle the issues that growers are facing. Moreover, many students don't know about the extension service component of the agricultural sciences; they are often only aware about teaching and research activities that take place at an academic institute. The objectives of the current project were to bring organic and conventional growers as well as extension faculty into a classroom for a panel discussion; give students an opportunity to learn directly from the growers about the issues that they face in their sustainable crop production operations; and to learn how the extension faculty would address those issues and make recommendations. The students indicated a positive impact on their learning about the real-world issues in sustainable crop production, along with an increased awareness and appreciation of the contribution of extension faculty in helping growers addressing those issues.

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Teaching the Science of Nontraditional Water on Food Crops, with Animations and Interactive Media

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Climate variability is placing severe stress on traditional agricultural irrigation sources, such as groundwater, increasing the probability that to-

morrow's agriculture will rely, in part, on nontraditional irrigation water sources, such as recycled water. Agricultural instructors need tools to help students understand the scientific underpinnings related to using recycled water, ranging from water testing and sampling to helping maintain public confidence in the safety of agricultural crops. Visual and interactive media can help learners understand the science used to evaluate and guide the use of recycled water. New animations, visualizations and interactive virtual labs have been developed to teach science principles supporting emerging uses of nontraditional irrigation water and explain how recycling water can be a safe, responsible contribution to the water cycle. Educational goals and the development process of producing these tools will be discussed from the perspective of work in the Department of Innovative Media and Extension at New Mexico State University in collaboration with scientists, Extension specialists, and water experts brought together by the University of Maryland School of Public Health (ConserveWaterforFood.org; USDA/NIFA-funded project 20166800725064). We will demonstrate our interactive virtual lab, "Sampling and Testing Irrigation Water," which provides students and the public a window into procedures for characterizing microbiological contaminants from a pond, stream, ditch, or treatment plant. Learners can manipulate virtual models of laboratory equipment and, using representative data, learn how scientists characterize water quality. These and other media tools will be freely available at MediaProductions.nmsu.edu.

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Perceived Changes in Intercultural Knowledge and Competence from Study Abroad

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Understanding intercultural knowledge, skills, abilities, and cultural diversity is necessary to prepare college students for global careers. Research shows university students participating in study abroad increased their intercultural competencies. The AAC&U defines intercultural knowledge and competence as cognitive, affective and behavioral skills, and characteristics that support effective and appropriate interaction in various cultural contexts. The purpose of this study was to describe students' intercultural knowledge, skills, and abilities after participating in agricultural-oriented, short-term, study abroad programs. Texas A&M University students (N=76) who studied in Costa Rica and/or Namibia during 2017-2018 were asked to describe their intercultural knowledge, skills, and abilities. Responses were recorded before and after study abroad experiences. Content analysis of pre-travel results showed students perceived themselves as having intercultural competencies such as being open-minded, adaptable to change, and experiences with multicultural persons. However, their understanding of intercultural knowledge and competence was limited because they lacked exposure to foreign cultures. Post-program responses indicated that intercultural knowledge and competence was improved because some students developed minimal foreign language skills, but most noted changed perceptions of their host country (i.e., culture, behavior, etc.). Students gained appreciation and respect for others' cultures, explaining their preconceived thoughts about host country nationals were largely based on stereotypical ideas. Study abroad program facilitators should require students to research their study abroad locations,

cultures, peoples, etc. to develop better understanding of another culture before travel. Further research on the impact of multicultural exposure is recommended to determine global market readiness before and after studying abroad.

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Growing Our Mindset: A Diversity Summit Assessment

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In 2003, the Kansas State University College of Agriculture Diversity Programs Office was formed to assist the college with the recruitment, retention, and graduation of underrepresented students. In consortium with the Kansas State University Tilford group, the college has been able to make significant strides in recruitment, retention and multicultural student placement. Tilford multicultural competencies are founded in three primary discussion areas; Knowledge, Personal Attributes, and Skills. These competency areas have been part of the foundation of GENAG 210: Human and Cultural Diversity in the Food and Agricultural Sciences. With diversity's emphasis in education, our office seeks to educate students, faculty, and staff in the areas of cultural competency. To realize the objective, our office partnered to host a student-led diversity summit entitled "Growing Our Mindset" in the fall of 2017. At the conclusion of the summit, participants were asked to complete a Likert scale questionnaire that measured their development of cultural competencies as a result of participation in the forum. Overall, attendees responded favorably to the diversity forum event. Attendee responses indicated that a second "Growing our Mindset" event was necessary. To continue this diversity effort, we utilized the Diversity 101 exercise, in conjunction with agriculture student organizations, Minorities in Agriculture Natural Resources, and Related Sciences (MANRRS), corporate partners, and participants in the GENAG 210 course to further put cultural competencies into practice. Additional evaluations were administered after the Diversity 101 exercise and the second "Growing

Our Mindset” event. All evaluations were analyzed using descriptive statistics.

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A Design Process for Multimedia Learning Tools

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Mainstream educational resources at the college level increasingly encompass multimedia tools, such as educational games, simulations, webpages, animations, and videos. Creating these products for agricultural science students demands a careful design process to accommodate pedagogical, content, and quality-of-experience goals. The Learning Games Lab in the Department of Innovative Media Research and Extension at New Mexico State University has developed an instructional design and production model for creating multimedia products and games with educational purpose (including what are called “transformational games”). Their iterative design process draws on the expertise of content experts and educational theorists and the production experience of a team of professional animators, artists, game designers, writers, and programmers. Diversity of representation on screen and in user-testing is a priority. By testing games with the target audience during development (“formative testing”), the team refines educational and quality-of-experience goals to better meet the educational needs and media tastes of the targeted group. This model was published in 2014 and has since been continually used and refined, to produce learning tools for food safety, animal science, plant science, soil science and environmental science. In 2017, the Learning Games Lab provided consulting, research, and formative testing to a large media technology company. By sharing our Learning Games Design Model with agricultural science teachers, we hope to elucidate the complexity of designing educational tools for student audiences and convey

best practices for moving forward with an idea for an educational product.

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Farm to Fork: An Honors Course on Food Systems

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A regional university has offered Farm to Fork for two years as a course for honors credit. The course consists of a variety of topics and activities but emphasizes a comparison of community-based food systems to national and global food systems. A key component of this course, which is available to students from the Honors College with majors representing many different disciplines other than agriculture, is farm-based learning. Farm-based learning is experiential learning on the farm obtained in real-time by working side by side with other students and volunteers under the direction of a faculty member or graduate assistant. The farm setting where the learning occurred was a small fruit, nut, and vegetable farm owned by the university. Spring class activities were oriented toward pruning, plowing, planting, mulching, mowing, and weeding with the intent to restore the condition of the farm for a summer U-pick season. Positive feedback from the first year’s class prompted offering it a second year with an expectation that eventually, the farm will be operated and managed by students with a faculty member serving only as a technical advisor.

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Supporting Students in Verbal Communication Courses: Insight on Reducing Speaker Apprehension

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The ability to communicate verbally is the top-ranked applied skill sought by employers of four-

year college graduates, with 95.4% of respondents on a recent survey reporting “oral communications” to be “very important” for success in the workplace. Agricultural degree programs aim to ensure oral communication proficiency among graduates through verbal communication coursework. Courses focus on translating technical knowledge to lay audiences, as well as helping students convey their passion for agriculture persuasively. However, students are known to have anxiety related to public speaking, which can prevent students from improving their oral communication skills. One common practice used by instructors to support students is planned interventions to build confidence and skill. What is not known is which interventions do students view as more efficacious, which do they prefer, and is there a distinction between interventions and course structure with regard to lessening anxiety. This study seeks to answer those questions by utilizing the Personal Report of Communication Apprehension-24 instrument and Self-Perceived Communication Competence Scale as pre- and post-tests to measure students’ apprehension and confidence before and after a series of interventions in an undergraduate verbal communication course. A second instrument collects self-reported data on students’ perceptions of, and preferences for, the interventions and course structure. Study results have implications regarding: (a) which interventions and course structures should be adopted to maximize the effect of verbal communication courses in improving student success in the workplace, and, (b) linking specific interventions or course structures to lessening speaking apprehension.

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A Land-Grant Model: Connecting University and High School Teachers through STEM Adventure

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The Land-grant Outreach for Community-based Agricultural Learning for Science, Technology, Engineering, and Mathematics Education (LOCAL STEM) project followed the land-grant university’s mission to connect a university with local communities and solve real-world problems. The project aimed to develop a localized land-grant model of teacher professional development for the integrated agricultural STEM education. A year-long teacher professional development program was the main activity offered to the high school teachers to increase their STEM teaching capacity. The program structure included a one-week immersive learning experience and face-to-face summer professional development; online curriculum writing professional learning community meetings; an access to resources and consultation at Pinney Purdue Agricultural Center located in the local community; and the STEM showcase event. A hydroponics curriculum developed by a team of faculty members was used as an example to demonstrate an integration of biology, physics, chemistry, and engineering units in agricultural context. There were 12 local high school teachers from agriculture, science, and mathematic disciplines participating in the program. Teachers were given ideas to incorporate contexts from the local farm in their teachings and a teacher conducted field trips to help his students learn about the horticultural research studies and harvest produce at the farm. In addition, the teams of teachers from each school co-designed an integrated agricultural STEM curriculum across disciplines. To date, the teachers reported the impact of this project on 351 students being involved in the lesson plans; 114 students assisting in designing an experiment; and 51 students participating in the immersive learning experiences.

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PK-12 Workshops Focused on Parent Engagement of Non-Traditional Students in College of Agriculture

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PK-12 workshops are offered each semester at Purdue University to help faculty, staff and graduate students learn strategies to advance their efforts to engage with PK-12 audiences. Strategies of recruitment and retention of non-traditional students in agriculture is important because the U.S is becoming a more racially and ethnically diverse country. In Fall 2017, three workshops focused on connecting and engaging parents with PK-12 activities: (1) Diverse Student Views of Agriculture: What my parents said about agriculture; (2) Marketing Agriculture and STEM Careers to High School Parents; and, (3) Parent Views of Career Preparation in Agriculture, Food and Natural Resources. In total, 30 participants completed a questionnaire upon completion of the workshops. Results showed that participants agreed that they had a better understanding of career opportunities in agriculture, food and natural resources; how to apply strategies to market career opportunities for PK-12 student to their parents; and, networked with other colleagues in the College of Agriculture regarding PK-12 engagement and outreach. PK-12 workshops provide practical approaches and strategies for faculty, staff, and graduate students to advance PK-12 engagement and outreach activities in the College of Agriculture. Parents play a key role on building relationships with PK-12 students to provide support for PK-12 students to make career decisions that may lead to careers in the agriculture, food and natural resources system.

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Role of Women’s Empowerment in Sustainable Development Goals

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The United Nations agreed upon the 17 Sustainable Development Goals (SDGs) to be achieved by 2030, identifying them as the root causes of poverty, inequality, and climate change. On closer inspection of the SDGs, the fifth SDG: “achieve gender equality and empower all women and girls” is an interwoven theme throughout all the goals. Rather than an individual sustainable development goal, gender equality is a method of enacting broad change in the development field. Many of the global issues, such as clean water and sanitation, hunger, and employment, more deeply affect women. Therefore, women have the most to benefit from positive changes and achievement of the SDGs. Yet, there are some barriers to establishing gender equality as a measurable and achievable goal on its own. For example, foreign funded development programs rarely set gender equality as a principle objective and data and statistics pertaining to women are often missing. Women’s empowerment and gender equality are promoted through quality educational opportunities. The importance of quality education is recognized through the fourth SDG: “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.” This poster will highlight an innovative approach to international development and engagement programming. Through quality education, development actors can empower women and bring a needed perspective to community discussions.

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Integrated STEM Learning with Stella the Great and Bruno Uptown Funk Boss

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A vast majority of future careers are in the fields of mathematics and science, which requires future generations to embrace and excel in these subjects. A study conducted by the National Institute of Food and Agriculture expect employment opportunities in food, agriculture, renewable natural resources and environment occupations to increase by more than five percent between 2015 and 2020 for college graduates with bachelors or higher degrees. Engaging students in STEM integrated learning experiences with an agricultural life science context is necessary to enhance students' interest in agricultural and STEM-related fields. The success and advancement of future generations depend on this new information-based, inquiry-based and highly technological society. The objective of this innovative idea was to develop innovative and creative ways to engage students in integrated STEM learning experiences. Integrated STEM learning with Stella the Great and Bruno Uptown Funk Boss utilized STEM concepts with an animal science context to engage students in fun, interactive and engaging learning experiences and career exploration. The lessons include topics regarding canine care, health, nutrition and wellness. The incorporation of canines into the lessons fostered an engaging, interactive and student-centered learning experience.

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Creative Classroom Activities

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Teachers often implement creative classroom activities to cater to various types of learners. If well-

implemented, these activities could become effective teaching tools that make important course concepts easy to understand and difficult to forget. Three examples of creative classroom activities from different courses are presented in this poster with the intention of sharing these ideas and encouraging further discussion about innovative classroom activities. The first classroom activity was a futures trading game in an introductory agricultural economics course. Students applied futures trading concepts in an exercise that used college men's basketball tickets as the commodity. The second activity was a Lego sculpture activity in an agricultural communications writing class. In this class exercise, the student's ability to effectively write building instructions was evaluated based on the Lego sculpture made by another person that used the instructions. The third-class activity was a series of drive-through laboratory sessions in an introductory-level soil science course. Students were made to go through brief, compact laboratory sessions to reemphasize soil science concepts. All these class activities have shown to increase student interest in related class topics and even increased appreciation and understanding of key concepts.

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Old vs. New: Comparing Performance on Two State Teacher Certification Tests in Agriculture

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Agriculture teacher certification in Texas requires a candidate to pass the Texas Examination of Educator Standards (TExES) in Agriculture, Food, and Natural Resources, 6-12. In Fall 2016, a revised version of the exam began to be administered. The original exam had six domains: Foundations of Agricultural Education; Agribusiness & Economics; Plant & Soil Science; Animal Science; Agricultural Mechanics & Technology; and Natural Resources & Environmental Science. The new exam added a domain in Food Science

& Processing. This study used two sample students' t-tests to determine whether success by teacher candidates from Sam Houston State University on the new exam (n=118) differed from the old exam (n=38), in overall score, by domain, or by GPA. Candidates were found to be performing better on the new exam in multiple areas. Significant differences ($p < 0.05$) were found for overall score (+5.52 points), and in the Plant & Soil Sciences (+13.97 points), Animal Science (+14.91 points), and Natural Resources & Environmental Science (+9.3 points) domains. Notably, "new" test takers (3.38) had higher overall GPAs than "old" test takers (3.04). A regression analysis indicated significant influence of GPA, gender and major on overall test scores and scores on various domains in the new exam. Each 0.25 increase in GPA resulted in +2.57 points in the overall score. Females had a lower overall score (-12.30 points) than males. Multiple significant differences were found within domains between majors, such as Animal Science majors scoring 12.86 points higher than Agribusiness students in the Plant & Soil Sciences domain.

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Performance of Agriculture Teacher Candidates on a General Pedagogy State Teacher Certification Exam

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All teacher certification candidates in Texas must pass the Texas Examination of Educator Standards (TExES) in Pedagogy and Professional Responsibilities (PPR), EC-12. Secondary agriculture teacher candidates take the same exam as a candidate wishing to teach Kindergarten or 8th grade Physical Education. Domains include Designing Instruction & Assessment, Classroom Environment, Implementing Instruction & Assessment, and Professional Roles & Responsibilities (legal and ethical requirements). An overall score of 240 is required; candidates are not required to pass domains individually, only collectively. Multiple Linear Regression was used to analyze the

influence of overall GPA, gender, and major on the TExES PPR of students (n=32) from Sam Houston State University seeking teacher certification in Agriculture, Food, and Natural Resources. Overall GPA significantly ($p < 0.05$) influenced performance on the PPR. A 0.25 increase in a student's GPA resulted in 3.72 increase in their PPR overall score. Gender also had an influence on the overall score as females scored 14.80 points lower than males. A student's major was also found to have a significant influence on the PPR overall score amongst Animal Science students, as such students scored 10.58 points higher than students majoring in Agricultural Business. The TExES PPR is a theory-based exam; thus, researchers found the results interesting in regard to males scoring higher than females, especially given that there was no significant difference in the GPA of the males and females, with females even statistically having a higher GPA than males (3.41 vs. 3.35).

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How to Improve Classroom Evaluation of Learning Tools

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Funding agencies and institutions increasingly demand outcomes data to document educational innovations and faculty efforts. Asking colleagues to help by involving their classrooms in evaluation studies relies on instructor goodwill and the willingness of students to voluntarily participate. Thus, it is important to optimize the quality of the user experience not just of educational tools but also of the evaluation study, for both faculty and students. With this in mind, we administered pilot evaluations in four undergraduate agricultural science classrooms in advance of large-scale distribution and documented our findings. We refined the process for administering evaluations of educational tools by adjusting our evaluation procedure after each experience. Therefore, these findings are presented as "lessons learned" rather

than as data. Our adjustments ranged from the practical – having a foolproof way to onboard students to an online survey (such as a link in a classroom management tool; or a custom URL that is short and easy to type accurately) – to the ethical – considering whether students considered the experience worth their time, and how best to deliver useful learning in the context of an evaluation study. We also propose basic suggestions for classroom management during an evaluation study and how to manage extra credit on behalf of an absent instructor. By sharing findings from this pilot study, we hope to enrich others' strategies for administering evaluation studies – and obtaining buy-in from faculty and students – when testing learning products with students in agricultural science classrooms.

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Early College in Agriculture Education

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Early college education has been practiced in collaboration with high schools and community colleges, where high school students can enroll in college courses and earn a college degree, certificate or college transfer credits. An example of early college education in Hawaii has been documented in NACTA Journal 2017. However, early college education for teaching agriculture is new in Hawaii. Kaua'i Community College (KCC) and Kapa'a High School (KHS) faculty and administrators jointly worked and taught a KCC agriculture course, Introduction to Horticulture (HORT 200), to KHS students in the Fall of 2016 for the first time. The HORT 200 class offered at KHS included horticulture-focused lectures and laboratory exercises and field trips to the KCC Plant Biology and Tropical Agriculture laboratory and the Breadfruit Research Farm (Ulutopia). Ninety-five percent of the KHS students (N=19) successfully completed HORT 200 with C or better grades.

This result has encouraged KCC faculty and administrators to offer additional agriculture courses at KHS so that KHS students could earn a 15-credit certificate, Certificate of Competence (CO) in PBT, before graduating from KHS. Thus, HORT 200 was reoffered at KHS in the Spring of 2018 for a second time. Compared to the first offering, 36.84% more students have enrolled in HORT 200 in 2018. Offering college agriculture course(s) at high schools could encourage additional students to choose agriculture as a career goal and the credits earned prior to college admission could enhance college degree completion rates.

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Teaching Undergraduate Research Students the Value of Communicating Science

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The Molecular Agriculture Summer Institute (MASI) Fellowship is a 10-week research internship for undergraduate students in Purdue University's College of Agriculture. While the largest portion of the program is spent completing research or scholarly projects in a faculty mentor's lab or the field, fellows also participate in lunchtime science communication workshops designed specifically for them as developing scientists. The science communication workshops demonstrate the importance of translating research to both scientific and non-scientific audiences. Fellows learn methods of crafting an effective elevator speech, communicating their research to the public, designing an informative and professional research poster, and recognizing the major components of a research paper. As a part of the program, fellows design and present a research poster to industry representatives and present their research results at an additional university conference or symposium. After reflecting on their MASI Fellowship experience, one student noted, "*Science is awesome and so much fun, but*

this can only be shared with others if they can understand it. To share our joy, we must be able to communicate it." Said another, *"I understand that without the ability to adequately communicate science to the general public, it dampens our ability to help others with our discoveries."* The program coordinators and administration find great value in offering specialized communication training to science students who may not have completed formal coursework in this area and consider it essential to the program's continued success and development.

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A Front-End Analysis of Perceptions and Needs of Faculty Regarding Online Courses

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The demand for online courses is increasing steadily in higher education. However, research has shown that this shift presents new challenges and potentials to faculty and staff. While there has been much research and focus on how to meet the needs of students with online education, this project intends to focus on the needs and abilities of the faculty related to the development of online courses. This study explored factors impacting faculty perceptions and attitudes regarding the creation of new courses and the transition of existing courses into an online format. Specifically, this study looks at attitudes towards offering their courses online and barriers identified as a hindrance to this process. A survey questionnaire was distributed by the department of Youth Development and Agricultural Education online via an email listserv to faculty and staff in Purdue University's College of Agriculture. Preliminary responses were collected (N=51) and twelve departments were represented. Data revealed that 67.4% of respondents have never taught an online course but 61.7% of respondents believed that having their courses online ranged from useful to very useful. Respondents indicated the biggest barriers to building or transitioning courses

online were the amount of time involved and their comfort level in doing that process themselves. It is also important to note that 41.6% of respondents indicated a disinterest for teaching courses online. This information will directly influence the digital instruction initiative and be used to develop tailored support to faculty to maximize comfort and success during the process.

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Developing Global Competencies through Undergraduate Bi-National Team Activities

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Food and agriculture students need to develop cross-cultural and global competencies to strengthen their success as future professionals. Iowa State University (ISU), Ames Iowa and Makerere University (MAK), Kampala Uganda partner in a bi-national program, which includes service-learning in the Kamuli District Uganda. Undergraduate students spend six weeks working in rural primary schools by assisting in teaching integrated science and agriculture and producing nutrient-dense crops and animals to support school feeding programs and an outdoor learning laboratory. ISU (101) and MAK students (161) have participated in the program from 2006 to 2017. In bi-national teams, ISU and MAK students reside together, assist teaching, and work on team projects to benefit the school garden programs. Bi-national team projects support development efforts at primary schools and include agroforestry, gardening, composting, irrigation, beekeeping, poultry, health and sanitation, and human nutrition. While living and working together students discuss and reflect on principles of development, nutritional food security issues, and agricultural and educational systems. Their discussions are enhanced by independent reflective writing and group reflections where ISU and MAK faculty guide discussions on a particular topic. Based on reflection summaries, students described how

their worldview has changed, and in what ways global issues affect rural Uganda and the U.S. ISU students stated they appreciate their educational and living privileges and plan to increase the value of personal relationships and reduce their resource consumption. MAK students indicated they increased their personal value of agriculture as a career and their ability to influence positive change.

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Teaching Writing through Grant Narratives

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It is imperative to create courses and curriculum that best equip students with the knowledge and skills needed for success after graduation. One often overlooked skill is the ability to find, apply for, and manage grants. Thus, our objective is to share insights of how we transitioned a general, research-based writing course (AG 421/521: Writing in Agriculture) for undergraduate Agricultural Science students at Oregon State University to a course that focuses on the grant-writing process. As a component of the Agricultural Sciences major at Oregon State University, students must complete a major-related, Writing Intensive Course (WIC) prior to graduation per Baccalaureate Core requirements. This course challenges students to synthesize their knowledge in various areas of agricultural science, analyze how current issues impact the agriculture industry, explore careers in agriculture, and develop their written communication skills. Prior to its redevelopment, the course consisted of three papers culminating in a technological advancement summary. Now, the course focuses on grant writing as the final writing product. Through the composition of a rough draft of the grant narrative at the beginning of the course, and subsequent peer review and intensive revision of each component over ten weeks, students are empowered to compose quality grant narratives that are ready for submission. Through weekly process memos on each

submission, students reflect on their process and request specific feedback to develop their writing. Through these reflections, students have indicated that a task once unfamiliar has become an avenue for consideration for accomplishing their goals as successful agriculturists.

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What's on Your Syllabus? Preventing Student Academic Integrity Violations

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Honor codes, a culture of honesty, and academic integrity policies are not new concepts. Their purpose is to outline a student code of conduct regarding academic honesty matters. However, student dishonesty persists. Recent studies demonstrate that many students, as well as faculty, are unaware of what constitutes cheating. Issues such as group work on homework assignments; selling class notes, uploading test, quiz, and study guide files to services such as Quizlet; and turning in the same assignment for multiple classes are all considered academic integrity violations. Previous studies show faculty already feel time constraints when trying to maximize course content, so the syllabus is used to communicate assignments, procedures and the academic integrity policies. To reduce cases of academic dishonesty as well as educate students, faculty at the University of Arkansas have added specific academic integrity examples (in addition to the University of Arkansas honesty statement) that resonate with students such as infographics and cartoons. Specific examples are not only listed in the syllabus but also addressed on the first day of class with reminders reinforced throughout the semester. Additionally, academic integrity reminders are posted in the online course shell in Blackboard. As a result, students have demonstrated lower levels of academic violations and have expressed a better understanding of the academic integrity policy.

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**Multiple Homework Attempts –
A Strategy for Student Success?**

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The focus of this study was to see if student attitudes and scores on assigned homework correlated to their performance on tests in two sophomore animal science classes. In fall 2017, 28 horse science and 25 animal behavior students were given a common survey to assess how they approached online homework when given the opportunity to complete each homework assignment twice. Questions for each homework attempt were randomly generated from a question pool. Student scores on each homework attempt were used to measure performance improvement. Mean homework scores were then correlated to their test scores. Most students (91.6%) completed more than one attempt on at least one homework. Only 5.7% of students completed multiple attempts on all homework. When students were asked why they did not make more than one attempt on a homework assignment, lack of time (56.6%) and getting a good score on a first attempt (37.7%) were the most common reasons. Most students (82.2%) who completed multiple homework attempts felt that they would do better on tests. Of students surveyed 13.3% were neutral and 4.5% felt that multiple attempts on homework would not improve their test scores. Actual mean homework scores on a second attempt were 5.7% higher ($P=0.03$) compared to a student's first attempt. Test scores were positively correlated to homework scores ($r^2=0.38$, $P<0.001$). In summary, encouraging students to complete multiple attempts at homework improves both their homework scores and test scores leading to the successful completion of the course.

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**Promoting Indirect Academic Outcomes
and Future Aspirations via Food and
Garden Activities**

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Students face challenge of dissonance between content taught and application to real life which results in students' low motivation to learn, loss of curiosity, withdrawn attention, and may lead to dropping out of school. Food and garden activities offer contextualized hands-on experiences that allow students to use their senses to foster their learning such as tasting, cooking, planning for planting, and caring for plants, which encourages positive indirect academic outcomes. In addition, the activities link to careers in food and agriculture industries. This study compared two groups of middle school students: half of which did not participate or participated in low numbers of food and garden activities (0-4) and another half in high numbers (5-9). There were 112 students who completed the questionnaire at the end of semester. Results indicated that students who participated in the high numbers of food and garden activities reported to have higher intrinsic motivation, autonomy, and competence, as well as feel more engaged in the activities. In terms of future aspirations, the students participating in high numbers of activities also reported to be more engaged in school, more motivated to continue their education, more interested in careers in agriculture, and more inclined to entering careers in agriculture than those participating in low numbers of activities. The results suggested to highly recommend more use of food and garden activities to promote intrinsic motivation, school engagement, future educational motivation, and agricultural career aspirations among middle

school students. This study can help inform the university K-12 outreach programs.

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Understanding Student Dynamics Associated with Repeated Probation and Suspension

Anya Work* and Pete Ziegler
Virginia Tech, Blacksburg, VA

Academic standing within institutions of higher education is a policy designed to ensure students enrolled in the university have a realistic opportunity to finish. Students failing to meet this threshold are placed on academic probation to encourage stronger academic performance. In many cases students on academic probation are expected to seek support from advisors or other resources on campus. To improve student retention, we conducted a study of all current College of Agriculture and Life Sciences (CALs) undergraduate students that have experienced one or more types of academic probation. Students were divided into two groups: Group 1 experienced one term on probation and Group 2 has experienced two or more terms on probation or suspension. We looked at student demographics to identify any factors associated with multiple probations/suspensions. The only significant variable was gender, with males two times more likely to have repeat suspensions. Previous research on gender and academic success suggests male identifying students are more likely to struggle academically and less likely to seek assistance than female identifying students due to peer expectations and perceptions of masculinity. To understand the needs and beliefs of male identifying students on academic probation, we invited this group of students, along with high-achieving male students, to take part in a quantitative survey on study skills. We then followed up with individual interviews to learn more about participants' academic struggles. This understanding is key to the development of successful interventions to prevent repeated academic probations in male students.

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The Redesign of a Social Justice Course in Agriculture

Pamala Morris and Myron McClure
Purdue University, West Lafayette, IN

This presentation outlines important insights, strategies, and the process of redesigning a social justice course through the "IM:PACT" Instruction Matters: Purdue Academic Course Transformation collaboration, a university-wide effort to improve student competency, confidence, and retention by using research findings on sound student-centered teaching and learning. The process allows the instructor to have the time and opportunity to carefully analyze course delivery and content, learn new teaching pedagogies that encourage active learning, and reflect upon the structure of the course. More specifically, the presenters will share the step by step process of redesigning a social justice course in agriculture. The course provides a basic review of present social justice issues (race/ethnicity, gender identity, age, etc.). This process is often contentious in the classroom as students can become uncomfortable and sometimes incite hostile discussions. However, because of the redesign, students' value come in a deeper grasp of abstract perspectives about the topics and their discipline in the workforce. Approximately 70% of the college's students enroll in this course during an academic year including summer. Student evaluations are improving each year. This session should benefit any one teaching or developing diversity/social justice courses and or workshops in agriculture.

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A Novel Teaching Approach to Enhance Students' Understanding of Food Safety Regulations

Ravi Jadeja and Ranjith Ramanathan*
Oklahoma State University, Stillwater, OK

The main goal of this project was to enhance students' understanding of Hazard Analysis and Critical Controls (HACCP) while helping small sized food industries to develop their food safety plans. In 2015, HACCP training was introduced as a three-credit hour course in the Food Science program at Oklahoma State University. The instructor has utilized mixed service approach based on cognitive and constructivist learning models to enhance students' understanding of HACCP. Two of the small sized (less than 20 employees) food processors from Oklahoma volunteered their food safety and operation details to the instructor. Undergraduate students from the HACCP classes (17 students in 2015 and 19 students in 2017) developed food safety plans utilizing the real-food industry information. The service learning based teaching approach was compared with other teaching strategies; lectures, case study, and flipped class. Effectiveness of these approaches were measured by a series of quizzes, student satisfaction surveys and midterm exams. The service learning based mixed model was found to be the most effective teaching approach for this class. When the service-based model was employed, on an average student quizzes and midterm score increased by 23.70% compared to traditional in-class face to face lectures. Student overwhelmingly (86.48%) preferred the service-learning approach over other learning approaches. A service learning based model could be a suitable approach to teach complex regulatory topics such as HACCP.

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Summer Garden Camp for Toddlers and their Guardians

Mingla Charoenmuang
Purdue University, West Lafayette, IN

Exposing children to garden activities is a way to engage them with nature which is important to their development intellectually, emotionally, socially, and physically. Constantly introducing them to a variety of fruits and vegetables can lead to a life-long healthy eating habit. Organizing a program for toddlers are challenging in terms of safety and attention span. Dig It! Garden Camp set up a program for guardians in the local community to work with their toddlers in two hours for four days spending time in the garden and participating in educational activities regarding food, natural resources, and environment. The program was scheduled in the summer to offer children experiences in the garden as well as the opportunities to incorporate fresh produce in the learning activities. The main activities were 1) gardening skills (using plastic hand tools to loosen the soil, planting seedlings, and harvesting radishes); 2) garden yoga which incorporated fitness and vocabulary; 3) story time (The Lucky Seed: What a Plant Needs to Grow narration and a short music-only animation about global warming); 4) role playing (pretending to be a seed and wearing an Earth planet mask); 5) craft activities (painting rock as garden markers and coloring parts of plants); and 6) healthful snacks. The twelve participating toddlers were under adult supervision at all time in the garden. Adults completed an evaluation form and toddlers verbally gave positive feedback. They were interested in returning for the future program. The adults reported positive changes in their children's interest regarding garden activities.

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Refining the Community Viability Indicator (CVI) Instrument: A Mixed Method Approach

Lane Woodward*, Asha Shayo, Sarah A. Bush, Rachel Mack and Rick Rudd
Virginia Tech, Blacksburg, VA

The ability to understand a community member's perceptions of community assets and resources assists in the planning for sustainable and resilient communities. Creating quality programs and equal opportunities in the community require an understanding of capable leaders, sustainable infrastructure, and community vision and their influence in making a change. Based on the community viability indicator (CVI) model the researchers developed a CVI instrument to measure community viability. The CVI model has four overlapping indicators identified as: community sentiment, capable leaders, sustainable infrastructure, and community vision. Diffusion of innovation, psychological sense of community, and the community capitals framework are combined to function as the theoretical framework to support the development of the model and measure. The aim of the study was to use both quantitative and qualitative data to further examine the instrument using a mixed method approach to identify potential item bias. Participants (N=196) responded to open-ended demographic questions. Using the demographic data, the researchers identified item bias for sub-groups within the sample population. The results aided in further development of the CVI instrument for usage by researchers and agencies tasked with community development. The findings of this research will provide a tool useful for teaching students about indicators of community viability involved in community change and contribute invaluable information for creating quality programs and opportunities cognizant of community sentiment.

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A Student Hosted Cattle Sale as an Approach to Experiential Learning

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Nacogdoches, TX*

Experiential learning is a teaching approach that can be beneficial to students. First-hand learning experiences engage students in ways that tend to be impactful on their education. Agriculture is a hands-on field that offers many opportunities for students to get outside of the classroom and participate in the industry. Advanced beef cattle students at Stephen F. Austin State University host the Purple Premium Cattle Sale each year. Students are responsible for obtaining consignment lots, renting facilities, and preparing the cattle for the sale. The sale exposes students to agriculture outside of the classroom and introduces proper care and marketing of cattle. The objective of this study was to determine if a student hosted cattle sale resulted in a beneficial learning experience. Students (n=25) completed two post-event surveys to reflect their learning experiences; one survey directly after the sale and the same survey 30 days later. Student responses determined that participation in the sale improved their leadership skills (76%), built their teamwork skills (96%), and reinforced the information taught in class (80%). Directly after the sale experience, 52% of students would recommend this course to others compared to the 30-day post-survey response of 90.9%. A similar comparison resulted when the students were asked to rate their overall experience. Post-survey results immediately after the sale indicated that 36% of the students noted an overall positive experience compared to post-survey response of 95.45%. In conclusion, a student hosted cattle sale is an effective approach to experiential learning.

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An International Model for Building Authenticity in the Classroom

Billye Foster*

Tennessee Tech University, Cookeville, TN

A desire to provide students with authentic experiences in a general education course was the impetus for this project and course revision. The primary objectives were 1) to provide instruction in basic strategic planning and assessment for administrators of 16 colleges and schools of agriculture; and, 2) to bring fresh perspective to the World Food & Society course taught in the States. Three weeks working with the USAid Farmer-to-Farmer program in rural Guinea with designated agricultural colleges in January 2017 included an additional meeting with women subsistence farmers providing authentic insight into the challenges facing smallholder farmers in developing countries. The professional assignment was invigorating by bringing practical management tools to a group of motivated learners eager for new information. The spin-off meeting with Group Fasso Demain (women farmers) illuminated the author's perspective toward classes taught in the States. Traditional focus on methods of teaching and learning shifted to include a new level of authenticity in the classroom. Sharing this experience led students to sharing their own international experiences and extending research assignments to include volunteer opportunities in developing countries. This opportunity with USAid and Farmer-to-Farmer served as a real-world catalyst for a more experiential and authentic classroom. Implementation of solid teaching and learning methodologies combined with authenticity of material covered opened new avenues of student interest and involvement. In turn, this led to maximization of learning and inquiring rather than simply presenting subject matter.

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Instructor Experiences in Implementing eCEAP eLearning Curriculum

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Lingying Zhao

University of Nebraska, Lincoln, NE

While environmental control of livestock and poultry facilities remains very important for sustaining animal health and productivity, as well as farm profitability, available educational resources on the design and management of these systems have fallen out of date. In response to the need for better educational resources, a multi-institutional team has developed twenty teaching modules as part of an eLearning curriculum called eCEAP (eLearning for Controlled Environment of Animal Facilities). The intent is that an instructor can pick and choose content from the various modules to obtain subject material to teach all or a portion of a semester-long course. This presentation highlights the experiences of three instructors in implementing (piloting) various components of the curriculum in their courses. Topics addressed include advantages and disadvantages for the instructor of utilizing eLearning modules, adaptations made to fit eLearning content to classes and to fit classes to eLearning content, and student feedback on the material. For example, an instructor will need to navigate content to meet the different needs of students in courses – engineers need technical depth for design, while other students/courses may need info for managing systems or more of an overview of how the relevant topics are interconnected. Also, instructors have their own preferences regarding whether they present material or utilize recorded presentations.

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Ag Mashup: Blending Agriculture and Communications Classrooms to Increase Agricultural Communication and Literacy

Jason P. de Koff
Tennessee State University, Nashville, TN

Nicole Kraf
Ohio State University, Columbus, OH

The number of farms in the U.S. have decreased by 46% since 1900 which may have helped to lower agricultural literacy rates in the U.S. Researchers observed that consumers have little knowledge of the agriculture industry and those in urban areas rated agriculture as lower in economic importance than those in rural areas. A novel solution focused on improving agricultural literacy in the Millennial generation by increasing communication skills of agricultural students and agricultural knowledge and awareness in communications students. A collaboration between a communications course at the Ohio State University and an agriculture course at Tennessee State University allowed for merging of specific assignments, interactions and lectures between these groups. Following an agriculture lecture to communications students on topics like GMOs, organic agriculture, and the farm subsidy program, 50% and 58% of communications student respondents indicated an increase in their likelihood to communicate agricultural topics to the public and identify resources with fact-based information on agriculture, respectively. About 45% of agriculture student respondents believed that their written communication skills increased and 64% believed that their oral communication skills increased as a result of the project. Also, following the project, 60% of agriculture student respondents identified an increase in their agreement with the statement, "learning effective communication skills are as important as learning scientific knowledge." These data reflect the potential that merging courses in higher education either across campus or across Universities can

have on increasing skills related to agricultural literacy.

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Spreading the Word: Educational Needs on Zoonotic Disease Spread and Prevention

Mariah Bausch* and Lauri M. Baker
Kansas State University, Manhattan, KS

As zoonotic disease epidemics sweep through the country, research is needed to determine preventative measures and control methods to minimize impact. A key factor in controlling zoonotic disease outbreaks is communication and education. This study looks at past education, education needs, information sources, communication plans, and levels of education of key audience groups; livestock producers, veterinarians, medical professionals, and emergency managers. In-depth, semi-structured, in-person interviews were conducted with participants from each audience group throughout targeted counties in Kansas. Audience groups were divided into two groups, agricultural related professions and non-agricultural; the question routes varied slightly per profession group with a total of 28 interviews conducted and analyzed. Preliminary results from indicate the University (College of Veterinary Medicine) was a trusted source of information among all audience groups. Other sources include state veterinarian, CDC, and local infectious disease doctor. Preliminary results also showed discrepancies in knowledge among all audiences. Many livestock producers did not know the term "zoonotic disease", however, they knew examples and the implications for their operation. In conjunction, medical professionals knew the vocabulary but did not know how it relates to animals or the implication of livestock production and human health. The third educational piece needed is education and communication with the public. During the study, it was clear that the public does not know the impact of zoonotic disease outbreaks nor the safety measures that should be taken. As stated by several participants, this lack of

knowledge can lead to fear and panic during future outbreaks as shown in past disease outbreaks.

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Taking Advantage of a Stinky Opportunity to Promote Science

Chad T. Miller
Kansas State University, Manhattan, KS

The corpse flower (*Amorphophallus titanum*) flowered at Kanas State University for the first time in 15 years last year. It is an endangered plant and unique for many different reasons. The corpse flower produces the largest unbranched inflorescence in the plant world and it is a very short-lived structure, lasting hours and smelling of rotten flesh. The value of this rare plant is that it provides great educational and outreach opportunities, centered on many different science concepts, including plant physiology, plant-pollinator interactions, plant life cycles, plant morphology concepts, among others. The flowering event was promoted and published widely on social media platforms and with traditional media outlets. Information posted included educational pictures and plant descriptions as it progressed to flowering and after flowering. The information reached thousands of individuals, locally, across Kansas, the United States, and the world. Social media (Facebook) data show between 40,000 and nearly 100,00 people were reached for several department Facebook page posts. In a period of about 4 days, there were over 2,000 visitors who stopped to observe and photograph the plant. Of course, the greatest impact for this rare species is greatest when in flower. However, continued learning opportunities exist while the plant is not in flower and can create excitement before it flowers again. The rarity and the uniqueness of this plant (and other specimen plants) make it a great attraction and novelty that provides opportunities to convey the value and importance of science not just in the classroom, but to the greater community.

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Effects of Active Learning Activities on Student Engagement with Scientific Practices

Yujin Park and Diane Ebert-May
Michigan State University, East Lansing, MI

In this study, we investigated how effectively active learning activities engage students in scientific practices (e.g., creating models, analyzing data). We conducted in-class observations in two introductory biology courses (BS 161 Cell and Molecular Biology and BS 162 Organismal and Population Biology) during three randomly selected class meetings in each course. On the observation date, every active learning activity in a class was examined using published scientific practices criteria (3Dimension Learning Assessment Protocol [3D-LAP]) to determine whether they asked students to engage in the following: 1: Asking questions, 2: Developing and using models, 3: Planning investigations, 4: Analyzing and interpreting data, 5: Using mathematics and computational thinking, 6: Constructing explanations and engaging in argument, 7: Evaluating information. Also, one group (3-4 individuals per group) per each class was observed to determine how students cognitively engage with the scientific practices using the ICAP Framework. For three class meetings, 11 active learning activities (7 group discussions and 4 clicker questions) in BS161 asked students to engage with 5 types of scientific practices (1, 2, 4, 6, and 7). In BS162, 14 active learning activities (11 group discussions, 2 modeling activities, and 1 think-pair-share) asked 4 types of scientific practices (2, 3, 5, and 6). In both classes, the most frequently asked scientific practice was “constructing explanations and engaging in argument.” Our results indicate that regardless of the type of learning activities, the activity can be designed to engage students with scientific practices.

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Implementation of a Bioinformatics Project in an Undergraduate Genetics Course

Gabrielle Johnson*, Keenan Amundsen, Joseph Dauer, Tiffany Heng-Moss and Donald Lee
University of Nebraska, Lincoln, NE

Bioinformatics and computational biology are becoming increasingly important instructional areas in undergraduate life sciences. Implementation of bioinformatics learning into undergraduate curriculum can be accomplished with the development of bioinformatics/ computational biology courses and by integration of this learning into currently delivered life sciences courses. An integration approach to introducing bioinformatics was tested in a second-year undergraduate genetics course. An individualized student project was designed to introduce students to basic applications that geneticists would conduct in public genomic databases. This activity-based project was delivered to the traditional face-to-face, hybrid, and online student learners in the various sections of this genetics course. Instruction for conducting the bioinformatics project activities used online lectures, instructor examples, and guided student discussion board assignments. Throughout the project, students are introduced to PubMed Central, the NCBI Nucleotide database, protein BLAST via UniProt, and Protein Data Bank searches. The utilization of these databases has been integrated to flow with the instruction of inheritance, DNA diagnostics, gene sequence conservation, and protein structure/function. The intention was to allow students the opportunity to gain further understanding of the genetics course content, while customizing their learning. Formative assessment during the project includes student discussion board posts. The summative assessment for the project is the development of a final student presentation. A student feedback survey suggests the implementation of this module in the course enhanced student learning and engagement.

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Expectations and Experience of Mentoring in an Undergraduate Summer Research Internship

Carol A. Speth*, Martha Mamo, Donald J. Lee, Leah Sandall and Salvador Ramirez, Jr.
University of Nebraska, Lincoln, NE

USDA-NIFA funded an undergraduate summer research internship program in Applied Plant and Soil Science. Each internship was an individual learning experience between student and mentor, but interns also participated in weekly think tank sessions focused on team activities. A 24-item survey developed by Retallick and Pate (2009) was administered to the mentors at the beginning of the internship and to the interns at the beginning and end. Data from the first cohort of six students who completed the program in 2017, is being used to decide how well the survey, together with weekly journal entries, met project evaluation needs. This presentation will focus on four items that reveal interesting differences between interns' perceptions at the beginning and end of the program, and between interns and mentors. Mentors de-emphasized having intellectual status and demonstrating outstanding job skills themselves. The interns were impressed with their mentors' effectiveness, role modeling in the discipline, and intellectual status. Interns came in expecting somewhat more demonstration of strategies for accomplishing goals and development of a professional identity than they received. Weekly journal questions provided additional evaluation information, such as how their mentors helped them think about project goals including 1) Decision making, 2) Team building, and 3) Systems thinking. Their comments suggest the mentors, regardless of whether they were university, private industry, federal agencies, or non-government organizations, were effective in helping the interns meet program objectives. These analyses will be shared with project and department mentors to facilitate discussions of next year's assessment strategies.

Workshops

1

Creating an Inclusive Classroom

COORDINATOR: Ann Marie VanDerZanden
Iowa State University, Ames, IA

PRESENTERS: Laura Bestler and Sara Marcketti
Iowa State University, Ames, IA

The 2015 US Census reports an increasingly more diverse population. As the American population diversifies, colleges and universities must transform their educational practices to meet the needs of an increasingly diverse student body. In an effort to begin addressing this need at Iowa State University, a taskforce of faculty, graduate, and undergraduate students worked under the direction the university teaching center to develop a multi-pronged approach to build positive student learning experiences through creating inclusive classrooms. Participants in this training: identify their own attitudes towards inclusion and determine how it impacts teaching; enhance instructional skills that contribute to an inclusive campus environment; and learn about student support resources at the university.

Four short pre-conference online learning modules are available through CELT's (Public) Inclusive Classroom Online Modules Canvas course site (<https://canvas.iastate.edu/courses/49066>). The information will be instrumental to our face-to-face program; therefore, we encourage you to review the modules prior to the event. After participating in the pre-workshop learning modules and the face-to-face program, participants will:

- Identify discipline-based and course specific improvements to foster inclusive excellence in the classroom.
- Develop an individual action plan for promoting inclusion in the classroom.
- Become familiar with resources and programs that support diversity and inclusion.

Presenters will also be able to share how this campus-wide initiative moved from gathering stakeholder input to development of pre-workshop online training modules, extensive online support resources, and the successful offerings of the workshop since spring 2016.

2

We Are All Experiential Educators – Clarifying the Role We Play in Facilitating Great Thinking through Experience

COORDINATOR: Marshall A. Baker
Oklahoma State University, Stillwater, OK

PRESENTER: Lauren Cline
Oklahoma State University, Stillwater, OK

Experiential learning is a term that is often used in colleges of agriculture, request for proposals, and course descriptions, but what exactly does that term mean? So often we discuss experiential learning as the internship components of programs, study abroad experiences, laboratory exercises, or field visits. Though there is some truth to those discussions, experiential learning is much more than “hands-on” learning experiences. Experiential learning, when correctly defined, is more about a holistic student learning process that includes every element of their college experience, from classroom to internship. Further, every educator plays four vital roles in facilitating this experiential process for students: (a) facilitator, (b) expert, (c) evaluator/standard setter, (d) coach. An internship is not truly experiential without a connection to course content. A lecture has little relevance without honoring student context. A study-abroad trip alone could be non-experiential if it is not provocative and includes expert facilitation. Bottom line, experiential learning is best used to describe the holistic college learning experiences – it is so much more than we traditionally think!

Workshops

In this workshop, we will:

1. Describe the experiential learning process.
2. Understand our own learning styles to better understand how we teach.
3. Identify the four key roles educators must play to facilitate true learning.
4. Take the Kolb Educator Role Profile to assess your preferences in the four experiential teaching roles.
5. Interpret our educator role reports that includes detailed feedback and strategies.
6. Present a conceptual model of experiential learning in colleges of agriculture.
7. Identify specific strategies to employ in our classes to make them more experiential.

3

Intentional Learning: Maximizing Transformational Learning Experiences with Purposeful Reflection

COORDINATOR: Daniel Foster
Penn State University, State College, PA

PRESENTERS: Daniel Foster
Penn State University, State College, PA

Matt Reutlinger
National FFA Organization

Numerous NACTA members have shared best practices of transformational learning experiences and purport to follow an instructional design philosophy of Kolb's Experiential Learning Theory in their pedagogy; however, Dewey said, "We do not learn from experience, we learn from reflecting on experience." With the importance of reflection by the learner on the learning experience they are engaging in accepted, the professional development questions become: How are we preparing to facilitate that purposeful, intentional reflection? What are ways we can be more deliberate and skillful in guiding learners to discovery intended outcomes?

The goal of this interactive workshop will be to utilize a three-dimensional matrix as a pedagogical

tool to empower participants to consider reflection in a tactile way. The following learning objectives will guide the professional development session. Upon completion of the session, Participants will be able to:

1. Provide an example of four common genres of reflection.
2. Plot and manipulate reflection strategies (new or familiar) on a three-dimensional matrix.
3. Identify factors that dictate movement of reflection strategies around the matrix.
4. Identify additional references and resources for facilitating reflection
5. Discuss Best practices for future implementation in courses and learning experiences.

As we consider the NACTA Mission, reflection is an organizational cultural expectation we expect from our students, peers, and leaders. To help achieve total student success, we must be intentional in dedicating purposeful time to have formal and dedicated dialogue around the critical element of reflection.

4

Promoting Yourself: How to Showcase SoTL in Your P&T Dossier

COORDINATORS: Tracy Hoover
Penn State University, State College, PA

Jeff Hattey
Ohio State University, Columbus, OH

This workshop will focus on how the Scholarship of Teaching and Learning (SoTL) can be incorporated into promotion and/or tenure dossiers. The program will feature administrators from different institutions who will share how SoTL is evaluated in the tenure and/or promotion process. Additionally, the workshop will feature a panel discussion with newly promoted faculty from different institutions as well as the opportunity to engage through roundtable discussions. Topics will include how to

promote and feature SoTL activities such as, innovative teaching activities and programs, grants and contracts that support SoTL, supervision of students, curriculum enhancement, international teaching, student development and recruitment, club and organization advising, teaching awards, academic advising and mentoring.

Presenters and Workshop Agenda

- The Scholarship of Teaching and Learning in different institutions – Administrators from universities and colleges will provide an overview of how the Scholarship of Teaching and Learning (SoTL) is evaluated and assessed in the tenure and/or promotion process.
- SoTL from a faculty perspective. What did you feature, showcase, and share in your materials beyond student and peer evaluations to reflect impact in the SoTL? - A select panel of four to five faculty who have been recently promoted will share how they crafted, portrayed and included SoTL in their dossiers.
- The workshop will conclude with round table discussions featuring presenters and select SoTL criteria and activities.

5

Making Learning Come Alive: Using 360 Video, Augmented and Mixed Reality in Agriculture

COORDINATORS AND PRESENTERS:

OP McCubbins

Tennessee Tech University, Cookeville, TN

Will Bird

University of Tennessee, Martin, TN

Creating engaging learning environments can be challenging for educators at all levels. This workshop aims to empower instructors to create and implement dynamic instructional materials in their courses to make learning come alive. Instructors will learn how to capture and share 360-degree videos, design augmented reality learning objects, and leverage students' personal devices to

maximize learning. Topics will assist educators in meeting the needs students who increasingly prefer technology integration in learning environments.

NACTA seeks to improve postsecondary teaching of agriculture. This workshop aims to improve the learning experience for students by empowering post-secondary instructors to embrace innovative technology to create engaging learning environments.

Workshop Objectives

At the conclusion of the workshop, participants will be able to:

- Utilize 360 cameras for creating instructional material/supplements.
- Build interactive lessons with augmented reality software and QR codes that can be used alongside students' personal devices (i.e., smartphones or tablets).
- Identify appropriate virtual reality applications for educational use.
- Experience examples of technology integration utilized by the presenters.

Topics to Be Covered

- This workshop will introduce participants to various 360 cameras, augmented reality platforms, virtual reality systems and how to use each.
- 360 Cameras: Facilitators will have six 360-degree video capture kits for participants to utilize in creating content.
- Augmented Reality: Participants will connect augmented content to QR codes and other customizable content markers to engage students with.
- Virtual Reality: Facilitators will have five mobile virtual reality workstations for participants to test and explore applications.

6

**Developing Intercultural Competence
in Students through Study Abroad
Experiences**

COORDINATORS AND PRESENTERS:

Mary Wiedenhoeft and Shelley Taylor
Iowa State University, Ames, IA

SPEAKERS:

A mix of speakers will present and lead discussion on the workshop topics including ISU faculty and staff involved in study abroad and assessment of intercultural competence.

Many universities and colleges have included in their strategic plan, goals for preparing students for lives and careers in a global community. Globalization has created a demand for increased intercultural competence in college graduates who will soon enter the 21st-century workforce. The metric often cited is the number of students involved in study abroad activities. Intercultural competence, the ability to interact effectively with people of different cultures, can be assessed with various available assessments. Although the number of students participating in a study abroad experience is a valid metric; there are many models of study abroad allowing students opportunities from several weeks to several semesters. We want to explore the depth of their experience regarding intercultural competence.

Objectives

During this workshop, we will introduce study abroad as a tool for providing intercultural competence, explore some tools used for assessing intercultural competence for students participating in study abroad and work interactively to help participants apply these tools and questions to their own situations. The questions we would like to address in the workshop are: 1) What is intercultural competence? 2) What are the assessment tools that can be used to assess intercultural competence for a variety of study abroad models? 3) What intentional strategies can be used prior to, during, and after the student has completed the experience.

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Journal Awards

Crystal Allen, University of Illinois

Membership & Public Relations

Tracy Dougher, Montana State University,
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Educational Issues and Teaching Improvement

Brian Pearson, Chair, University of Florida

Teacher Recognition

Wendy Warner, Chair, NC State University

International Committee

Laura White, Co-chair, New Mexico State University
Kelly Newlon, Co-chair, Ohio State University

NACTA Foundation Advisory Council

Tracy Dougher, Montana State University

Experiential Learning Committee

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Tracy Rutherford, Co-chair, Texas A&M University

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NACTA Committees

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, Term 2016-2018

University of Florida

bpearson@ufl.edu

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

North Carolina State University

wjwarner@ncsu.edu

Journal Committee

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

College of Southern Idaho

nactaeditor@pmt.org

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 - Crystal Allen, Term 2016-2018
University of Illinois
callen@illinois.edu

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.

Committee Chair - Laura White, Term 2016-2018
New Mexico State University
lmwhite@nmsu.edu

Committee Co-Chair - Kelly Newlon
Ohio State University
newlon.7@osu.edu

Nominating Committee

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.

Committee Chair - Tracy Dougher
Montana State University
tracyaod@montana.edu

Membership and Public Relations Committee

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
Montana State University
tracyaod@montana.edu

Undergraduate Experiential Learning Committee

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.

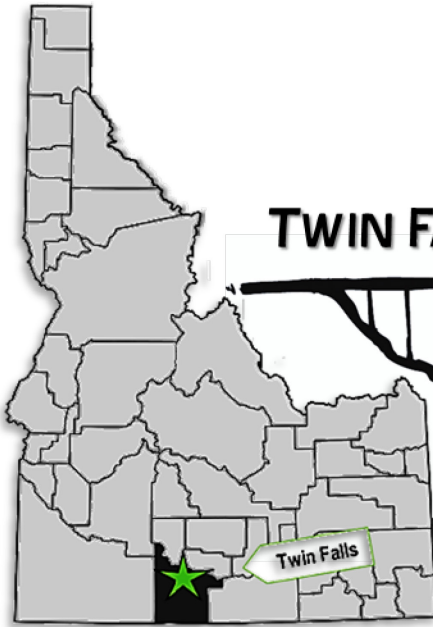
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