The Agricultural
EDUCATION
MAGAZINE

July/August 2022
Volume 95, Issue 1

Nonformal Agricultural Education

Nonformal Agricultural Education: "Doing to Learn"

by Gaea Hock

This time of year is filled with many nonformal agricultural education opportunities for our students and for us as professionals. One of my favorite nonformal agricultural education activities is the Kansas Department of Agriculture's Ag Summit. They have held this event since 2016 (the 2020 Summit was held virtually) as an opportunity for professionals across the many agriculture sectors in Kansas to meet and discuss common issues and challenges. I attend the event, held in mid-August, to learn and grow as an agricultural educator and agriculturalist. It helps me focus on how I can serve the broader agriculture industry and the important of role agricultural educators. Our K-State Agricultural Education seniors attend the event as a way to model the importance of nonformal agricultural education and their vital role in the industry.

There are many ways to engage with nonformal agricultural education. You can participate in workshops offered by commodity groups, Ag in the Classroom, area wildlife areas, book clubs (such as the one sponsored by NAAE), and Extension programs. Participating in these professional development opportunities help us keep up to date with technology, content knowledge and agricultural topics.

Our students are also benefiting from nonformal agricultural education opportunities. You may be leading students on a multi-state agriculture tour, assisting them with their livestock projects for the county fair, or driving them to leadership development retreats this summer. They may

Corabel attended Zoo Camp for a week this summer. This is just one of the many nonformal agricultural education opportunities for youth throughout the year.

> As we reflect on the line in the FFA motto, "Doing to Learn," we can think about all the ways nonformal agricultural education enhances and supports school-based agricultural education.

K-State Ag Ed Seniors attend the Kansas Governor's Summit on Agricultural Growth hosted by the Kansas Department of Agriculture. This event allows students to learn and grow as professionals in the industry.

also be taking advantage of other nonformal agricultural education opportunities offered by a multitude of organizations and entities. (My six-year-old daughter participated in a week-long camp offered at an area zoo.)

As we reflect on the line in the FFA motto, "Doing to Learn," we can think about all the ways nonformal agricultural education enhances and supports school-based agricultural education. This issue highlights programs and practices that are excelling in reaching new audiences and educating others about agricultural issues and topics.

- How are you engaging with nonformal agricultural education entities?
- Do you have a relationship with your local Extension office and personnel?
- Have you identified nonformal education opportunities for your students in the local community, region, and state?
- Are your field trip experiences at the appropriate level to encourage genuine learning and reflection?
- Do you utilize nonformal learning activities to their fullest?

As you read this issue, I encourage you to reflect on the ideas presented and the advice provided to enhance your understanding and utilization of nonformal agricultural education.

Dr. Gaea Hock is an Associate Professor of Agricultural Education at Kansas State University and Editor of **The Agricultural Education Magazine.**

Nonformal Agricultural Education

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Distribution

Beginning with Volume 93, Issue 1, (July/August 2020), *The Agricultural Education Magazine* will be available in electronic format only, free to all, accessed through the website of the National Association of Agricultural Educators at http://www.naee.org/profdevelopment/magazine. All available back issues of the magazines are archived at this web address, also free to all.

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Articles and photographs should be submitted to the Editor or Theme Editor. They will acknowledge their submission. Items to be considered for publication should be submitted at least 90 days prior to the publication date of the intended issue. No items are returned unless accompanied by a written request. Articles should be approximately 1500 words. Information about the author(s) should be included at the end of the article. Photos and/or drawings appropriate for the "theme issue" are welcomed and should be submitted as separate files (jpg or tiff format preferred – minimum 300 dpi). A recent photograph (jpg or tiff format preferred– minimum 300 dpi) of all authors should accompany the article. Articles in the Magazine may be reproduced without permission but should be acknowledged.

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Publication Information

The Agricultural Education Magazine (ISSN 0732-4677), published bi-monthly, is the professional journal of agricultural education. The journal is published by The Agricultural Education Magazine, Inc. at 2525 Harrodsburg Road, Suite 200, Lexington, Kentucky 40504-3358.

Design and Layout

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Enjoy the Journey through Nonformal Agricultural Education

by Dr. Joseph L. Donaldson

Nonformal agricultural education is not new, but the examination and recognition of nonformal education is a relatively new phenomenon. About 50 years ago, scholars began to critically examine nonformal education and distinguish it from formal and incidental education (Coombs & Ahmed, 1974; La Belle, 1982). Nonformal education uses relevant activities and pragmatic results that emphasize out-of-school, casual learning (Peace Corps, 2004). Community and nonformal education are inextricably intertwined – nonformal education is based in and led by the community (Kpetay & Lozenski, 2021).

On the other hand, formal education is a highly configured system for learning and achievement, inclusive of primary schools, technical schools, and institutions of higher education. Formal education is characterized by structured learning, culminating with a formal assessment (Peace Corps, 2004). Nonformal education provides variety outside of formal education's lockstep instructional sequencing and scheduling (Krupar et al., 2017).

Incidental education encompasses everything we learn from our daily lives and may occur through observation, conversation, or an Internet search based on a curiosity or need. Unlike incidental education, nonformal education is a planned activity that engages learners with others, including one or more facilitators.

Nonformal education is so pervasive that in most countries, the number of adults pursing nonformal education far exceeds the total student population pursuing formal education (Kočvarová, 2022). Yet, it is often challenging to appreciate the depth and breadth of nonformal education due to the varied names and approaches such as Extension education, professional development, lifelong learning, and on-the-job training – all of these are examples of nonformal education. Nonformal education is ubiquitous in our society, and it occurs in afterschool programs, agritourism farms, aquaria, arboreta, botanical gardens, camps, cultural sites, gymnasiums, environmental education centers, historical sites, laboratories, libraries, museums, nature centers, parks, planetariums, and zoos, among other in-person and virtual spaces.

A recent United Nations report, *Embracing a Culture of Lifelong Learning*, has called for the recognition of nonformal education as a human right and for the metamorphosis of schools and universities to nonformal education academies which are "open to the community" (United Nations Educational, Scientific and Cultural Organization, 2020, p. 9). The literature supports nonformal education as important to individual well-being, public policy, and national prosperity (Krupar et al., 2017). Young people perceive that nonformal education enhances their human capital, including decision-making, communication, and employability (Souto-Otero, 2016). Nonformal education is evolving. In this century, podcasts, blogging, and other forms of digital media have emerged as important avenues for nonformal learning (Harju et al., 2016).

In agricultural education, conventional thinking is that nonformal education is synonymous with Extension education. Truly, the Cooperative Extension System remains the world's largest system for using nonformal education to solve problems (Rathore, 1999, p.7). However, nonformal education is broader than the Cooperative Extension System. School-based agricultural educators, for example, manifest nonformal education in a myriad of ways, including leadership development at residential camps (Brown et al., 2014) and science literacy in school gardens (Cramer & Ball, 2019).

In this issue, the authors espouse broad perspectives on nonformal agricultural education. This issue examines ways of enhancing agricultural education classrooms through nonformal education in aquaculture, land-based learning, leadership, and school gardens, among other topics. Additionally, the issue highlights contemporary issues in nonformal education including the need for internships to prepare the next generation of Extension educators and the need for effective public issues education in agriculture. As these articles suggest, nonformal agricultural education is insightful, challenging, and forward thinking. This issue, like all nonformal agricultural education efforts, presents a grand adventure! Enjoy the journey!

References

Brown, N. R., Terry, R., & Kelsey, K. D. (2014). Examining camper learning outcomes and knowledge retention at

Oklahoma FFA leadership camp. Journal of Agricultural Education, 55(1), 8-23. 10.5032/jae.2014.01008

Coombs, P. H., & Ahmed, M. (1974). Attacking rural poverty: How non-formal education can help. John Hopkins University Press.

Cramer, S. E., & Ball, A. L. (2019). Wild leaves on narrow STEMS: Exploring formal and non-formal education tensions through garden-based learning. Journal of Agricultural Education, 60(4), 35-52. 10.5032/jae.2019.04035

Harju, V., Pehkonen, L., & Niemi, H. (2016). Serious but fun, self-directed yet social: blogging as a form of lifelong learning. International Journal of Lifelong Education, 35(1), 2-17. https://doi-org.prox.lib.ncsu.edu/10.1080/02601370.2015.1124930

Kočvarová, I., Vaculíková, J., & Kalenda, J. (2022). Development and initial validation of the nonparticipation in nonformal education questionnaire. Journal of Psychoeducational Assessment, 40(3), 400–415. https://doi.org/10.1177/07342829211060571

Kpetay, S.T., & Lozenski, B.D. (2021) "To their benefit": Tracing (Pp)an-africanism through nonformal black educational space. Educational Studies, 57(5), 476-495, https://doi.org/10.1080/00131946.2021.1969933

Krupar, A., Horvatek, R., & Byun, S. (2017). Does Nonformal Education Matter? Nonformal Education, Immigration, and Skills in Canada. Adult Education Quarterly, 67(3), 186–208. https://doi.org/10.1177/0741713617697423

La Belle, J, T. (1982). Formal, nonformal and informal education: A holistic perspective on lifelong learning. International Review of Education, 28, 159–175.

Peace Corps. (2004). Nonformal education manual. Peace Corps Center for Field Assistance and Applied Research. Information collection and exchange no. M0042. Washington, DC. https://permanent.fdlp.gov/lps60403/m0042_nfe-manual1.pdf

Rathore, O.S., Chauhan, M.S., Dhakar, S.D., & Ojha, S.N. (1999). Handbook of extension education. Agrotech Publishing Academy.

Souto-Otero, M. (2016). Young people's views of the outcomes of non-formal education in youth organisations: Its effects on human, social and psychological capital, employability and employment. Journal of Youth Studies, 19(7), 938-956. http://dx.doi.org/10.1080/13676261.2015.1123234

United Nations Educational, Scientific and Cultural Organization. (2020). Embracing a culture of lifelong learning. Contribution to the futures of education initiative. https://unesdoc.unesco.org/ark:/48223/pf0000374112

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An Introduction to Land-Based Learning

by Dr. Aaron J. McKim, Abbey Palmer, & Dr. Matt R. Raven

Land-based learning is an innovative approach to agricultural education which emphasizes hands-on learning, sustainability, and local engagement. The term "land-based learning" originated at the Center for Land-Based Learning (to learn more, visit landbasedlearning.org) which offers immersive experiences for youth and beginning farmers. In 2019, we introduced a four-step model detailing engagement in land-based learning (see Figure 1).

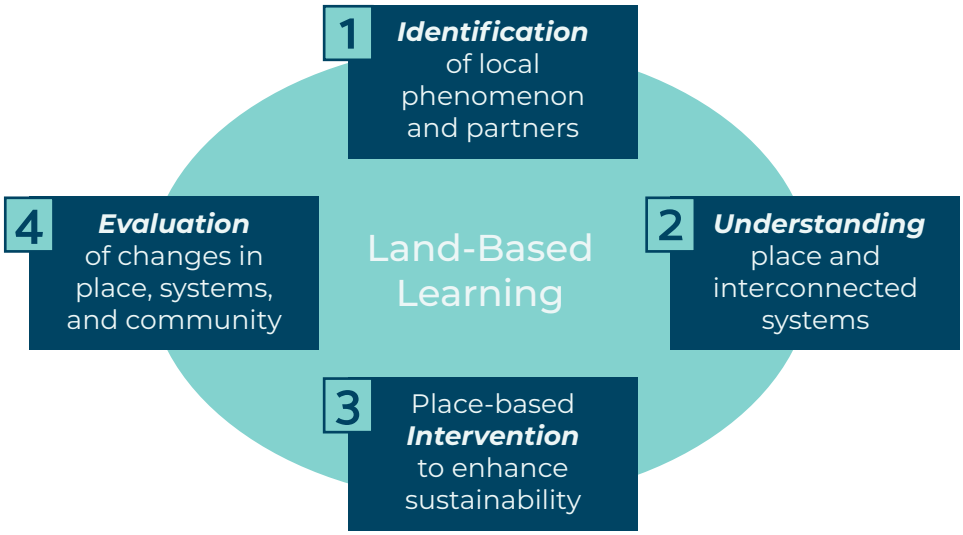

Figure 1. The Four Steps of Land-Based Learning (McKim et al., 2019).

As introduced, land-based learning is an educational approach; therefore, it should be utilized with groups of individuals in a formal or nonformal education setting (e.g., classroom, youth club, producers). To date, we have implemented land-based learning via two funded grants (USDA FASLP 2020-70026-33220; USDA NC-SARE 2017-38640-26916) to engage students in learning secondary school science (to learn more, visit canr.msu.edu/uprc/land-based-learning-center-projects). As we explore land-based learning in more depth, we pull from our experiences to provide examples of each step in the learning process.

> "The outcomes of land-based learning illuminate its utility as a community-centered and learner-centered educational approach."

The first step in land-based learning is identifying a local context. In most cases, this step includes identifying a local farm, farm operator(s), Extension personnel, and additional community members relevant to the context. As an example, the facilitator may initiate land-based learning by leveraging an established connection with a local producer supportive of community engagement. Once step one is complete, the facilitator engages learners in understanding the selected local context. **Step two in land-based learning typically involves learners visiting the farm and producer(s) visiting the learner meeting space (e.g., a high school classroom) to encourage mutual understanding.** Examples include learners touring the local farm, interviewing producer(s), and meeting with Extension personnel to learn more about local farming and sustainability practices. Learners are ready for step three when they have a robust understanding of the selected context, including challenges and opportunities relevant therein. A deepening understanding of place and interconnected systems, however, continues through the intervention and evaluation steps.

The third step in land-based learning is intervention. As the name suggests, the third step involves learners brainstorming, evaluating, selecting, and implementing an intervention within the local context to enhance social, economic, and/or ecological sustainability. The success of step three hinges on two critical elements: (a) the knowledge gained in step two provides the foundation for the intervention and (b) learners complete step three in collaboration with the team of individuals identified in steps one and two. Example interventions selected in step three include implementing cover crops for grazing fields, initiating a greenhouse marketing campaign, designing 3D-printed slug traps, and piping boiler room heat into a school hoop house to extend the growing season. Step three is a unique and powerful blend of analysis, collaboration, innovation, and action. **In the final step, the**

land-based learning team, including learners and community partners, evaluate the impact of the intervention, considering the direct and indirect community impacts relating to economic, ecological, and social sustainability. Example evaluation step efforts include testing soil for organic material, consumer surveys of purchasing preferences, and quantifying vegetable harvests.

Implementation of land-based learning results in benefits for both learners and their community. When compared to traditional methods of education, learners who engage in land-based learning are more engaged; realize greater gains in leadership, collaboration, and problem-solving skills; and build more extensive environmental and sustainability awareness (McKim et al., 2019). In addition to learner growth, land-based learning catalyzes relationship building, sustainability efforts, and youth empowerment within the community. The outcomes of land-based learning illuminate its utility as a community-centered and learner-centered educational approach.

As an agricultural educator, there are three potential roles you can play in land-based learning. First, you can be the *facilitator* of land-based learning. In this role, you walk learners through the four stages of the land-based learning experience. When first implementing the land-based learning approach, we recommend selecting interventions which are manageable in scope. As the scope of interventions increase, you may find some require funding to execute. In these situations, engaging students in writing a community and/or education-focused grant to support your land-based learning efforts extends the learning and impact.

The second role you can play in land-based learning is *collaborator*. In this role, another agricultural educator in the community is facilitating the land-based learning experience and has called upon you to be a member of the land-based learning team, offering insights into the local phenomenon. Like the facilitator role, the collaborator role requires educators guide learners as opposed to directing their work. This recommendation is particularly salient in step three of land-based learning. In this step, it is common for learners to negotiate many ideas of varying feasibility, allowing learners to construct their knowledge via negotiation and information gathering is favored over doing the thinking for learners.

The final role agricultural educators can play in land-based learning is *sustainer*. The role of sustainer entails expanding the utilization of land-based learning

(LEFT) Beau Rondeau from Superior Central worked with Log Cabin Livestock to monitor experimental plots on hay fields that are too remote from the farm to be grazed.
(RIGHT) Wyatt Gerner from Chassell School set traps at Gierke Blueberry Farm to investigate the life cycle of an emerging threat to Michigan's fruit industry: the Spotted Wing Drosophila (SWD) fruit fly.

within agricultural education. Sustainers are agricultural educators who utilize land-based learning in novel contexts, uncover new learning outcomes achieved during land-based learning, and share insights on land-based learning with fellow agricultural educators. In these ways, sustainers expand how land-based learning can be used and the number of learners impacted by this innovative educational approach. As scholar-practitioners within land-based learning, we find ourselves enacting the sustainer role; therefore, should you also identify as a sustainer of land-based learning, we invite you to connect with us to share your journey so we can learn and grow as a community.

Land-based learning differs from many traditional approaches to education; therefore, we recognize some hesitation may exist when considering incorporating this approach. However, we encourage agricultural educators implement the approach given the ways in which land-based learning uniquely achieves three valuable outcomes. First, content acquisition and skill development occur as learners engage in the land-based learning experience. Second, land-based learning yields community support via the relationships built with community members and tangible benefits brought to the community. Finally, land-based learning shifts your role as agricultural educator from the source of information to the source of experiences, unlocking your potential to seize additional learning opportunities for students as they engage in an authentic, collaborative, and problem-based experience. With this triad of benefits in mind, we invite you to become a land-based learning facilitator, collaborator, and sustainer.

Students from Iron Mountain High School visited Slagle's Family Farm to better understand the farm context as they researched the best site for a new composting area.

References

McKim, A. J., Raven, M. R., Palmer, A., & McFarland, A. (2019). Community as context and content: A land-based learning primer for agriculture, food, and natural resources education. Journal of Agricultural Education, 60(1), 172-185. https://doi.org/10.5032/jae.2019.01172

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Connecting Classrooms to Natural Resource Places and Faces: Electronic Field Trips and Virtual Reality Tours

by Dr. Jamie Loizzo, Christine Krebs, & Caroline Nickerson

Online Nonformal Communication, Education, and Engagement

Agricultural and natural resources communication, education, and extension disciplines can collaboratively converge in nonformal spaces to connect learners with science content and experts. Nonformal programs connecting scientists to PK-12 students in classrooms have the potential to increase youths' content knowledge, connection to natural environments, change attitudes, positively impact behavior intentions, and nudge participants to consider STEM careers. In an international survey of almost 5,000 scientists, 91% agreed that it is important to foster youth interest in science and engineering, and 86% believed it is important to communicate their work in an understandable way for the public (Wyndham et al., 2021).

Research shows there is a need for science communication to include dialogue, instead of pushing information in one direction (NASEM, 2017). It is critical to put a human face to science, simplify complex subjects while retaining meaning, and to engage in conversation about science in an authentic way (Seth, 2019). Nonformal science engagement programs provide a space and method for subject matter experts to connect with audiences in a variety of interactive formats (Krebs et al., 2020).

Field trips to locations such as museums, science centers, and zoos are one of the most popular teaching and learning activities for immersive learning outside of the classroom (NRC, 2009). However, physical field trips are not always possible due to logistical constraints. As an alternative, electronic field trips (EFTs) have emerged to vicariously connect learners in a classroom to experts in the field through real-time video streaming (Beattie et al., 2021). EFTs are nonformal programs typically integrated into formal classrooms with some level of interactivity.

> Electronic field trips (EFTs) have emerged to vicariously connect learners in a classroom to experts in the field through real-time video streaming.

Virtual reality (VR) is another emerging technology learners can utilize to engage in spaces beyond the classroom. VR typically includes 360° images or computer programmed environments viewable with headsets. VR has the potential to introduce learners to natural resource places they may not have otherwise encountered as well as environmental concepts such as climate change (Markowitz et al., 2018).

Streaming Science: Restore the Shore

Since 2016, The Streaming Science Project has embraced emerging instructional and communication technologies (ICTs) with goals to leverage cutting-edge tools for nonformal science engagement. Streaming Science offers a 'Scientist Online' EFT format that connects scientists synchronously one-on-one with schools (Krebs et al., 2020). Scientists present and demonstrate content, science communication graduate students facilitate the event and video production, and middle and high schoolers ask questions and dialogue with the experts.

Recently, Streaming Science added a new VR offering to its platform called 'Labs and Landscapes' that features 360° tours with immersive photos of various STEM locations (Stone et al., 2022). Science communication students use Ricoh Theta, GoPro Fusion, and Matterport cameras to take immersive photos and virtual tour creator platforms such as Theasys and Google Expeditions to publish VR experiences.

One of the latest Streaming Science programs called 'Restore the Shore' included EFTs and VR tours to connect youth with the University of Florida / Institute of Food and Agricultural Sciences (UF/IFAS) Nature Coast Biological Station (NCBS) in Cedar Key, FL. NCBS is located along the Big Bend of Florida and the Gulf of

Mexico and includes a three-story research building with a wet lab, teaching aquarium, offices, and classroom. Several scientists at the station work on a range of environmental conservation projects.

The Florida Sea Grant funded the project to provide teacher gift cards and Google Cardboard VR viewers for six middle and high schools throughout the state. Goals for 'Restore the Shore' included increasing students' content knowledge of living shorelines, ocean literacy, connection to water, and interest in related STEM careers. Florida and national science education standards informed the program development.

The EFTs were live 45-minute Zoom calls with two NCBS scientists (Figure 1) who presented content from the station about living shorelines and fish biology and answered student questions. Faculty and graduate students working on Streaming Science assisted with the video production and event facilitation.

The VR tours featured a living shoreline and the station (Figure 2). NCBS scientists are implementing three living shorelines using sand fill, marsh grasses, oyster sills, and reef balls to protect the coast from erosion and increase wildlife habitat.

Teacher Implementation Experiences and Feedback

The six participating teachers engaged with the 'Restore the Shore' program in spring 2021. Some of them taught hybrid courses (in-person and online) due to COVID-19 restrictions, and they were not taking physical field trips at the time. After completing the EFTs and VR tours with their classes, the teachers shared their experiences and feedback through interviews.

Most of the teachers' motivation to utilize virtual nonformal programming with their students stemmed from the need to supplement 'hands-on' or outside-of-the-classroom experiences. The teachers found ways to adapt the program to fit their unique class structures. One teacher shared, "I send a care package home to each of my kids who are at home, that have lab materials, and I included the little Google viewers in that, too."

Teachers also discussed the students enjoyed learning about a natural area outside of their immediate communities. One school was from a nearby city, and the teacher shared how excited students were to hear about a town they had previously visited. Contrastingly, a school from south Florida whose students were most familiar with Miami and Ft. Lauderdale really appreciated the stark contrast of a different coastal community like Cedar Key. One class was particularly inspired by their experience, and the teacher said, "They really liked the oyster domes. They thought those were the coolest things. We're already thinking about our service learning project. Next year, we will be collecting oyster shells from different restaurants, because they're excited [to contribute to the living shorelines project]."

Many of the teachers also expressed how the scientists made positive impressions on the students. One teacher working in a hyflex classroom described, "I thought it was great that the scientist talked about his background and how he hadn't been

April 2021 Scientist Online: Restore the Shore electronic field trip at UF/IFAS NCBS. Photos courtesy of Jamie Loizzo.

a super great student. Yet, he got turned on to science because he was a fisherman. He discovered you could make a living doing fisheries." Showing the students that there is a career in science that involves being outdoors and working with the environment and natural resources can encourage careers in those respective fields. A tenth grade biology teacher pointed out, "Especially those kids who are juniors and seniors, it's good for them to see, 'Oh, I can get a job with that?' None of them knew you could go fishing for a job. That was impressive to them."

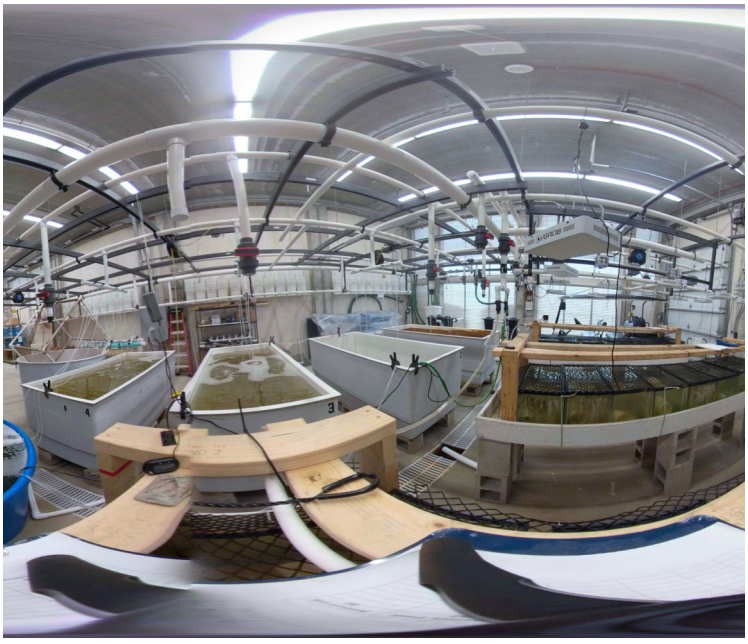
As for the programming, the teachers appreciated the curriculum support Streaming Science offered. Most of the teachers used the written guides from the program website to host the VR tours. For example, a middle school teacher explained, "I go through the tour. I use the handout to make sure that I was hitting everything. I'm having the vocabulary words, and those important points highlighted on there. I made sure to spend some extra time talking about it. I feel they were well done."

Our Recommendations for Successful Nonformal Engagement Programs

From our experience implementing nonformal STEM engagement programs with middle and high school teachers and their feedback, we offer the following suggestions for similar efforts:

- Provide teacher training and facilitation resources that are flexible. Teachers have limited time and utilizing a nonformal program in their classroom takes extra, deliberate planning. Consider polling the teachers for how they would prefer to receive the training, offer a teachers' guide, send minimal focused emails with written and pre-recorded video directions.
- Offer a menu of program content in various formats and allow teachers to tailor the content best to their classroom and/or hyflex environment. For instance, allow teachers to choose which EFT times to attend and which VR tours to utilize to complement their existing lessons and schedules.
- Deliver ready-to-use lesson materials such as VR tour facilitation guides, pre-made PowerPoint slides, and provide recordings of live EFTs for classes to view asynchronously at later dates.
- Assess the nonformal program's impacts through dynamic, creative, and simple to use assessments. Post-retrospective surveys can ask youth to compare their content knowledge and attitudes before/after their participation. Utilize a pre-existing instrument connected to the topic. For example, we used the Connectedness to Water (CTW; Warner et al., 2021) scale to measure changes in students' water attitudes. Arts-based research methods such as having students draw their conceptualizations of the program's main content, such as a living shoreline, can also give insight into how the EFTs and VR tours did/not change students' sense of place and understanding of the natural coastal mitigation strategy. Students appear to enjoy arts-based assessments as com-

VR tour living shoreline (LEFT) and wet lab (RIGHT) flattened sample images.
Photos courtesy of Caroline Barnett.



pared to surveys which might feel like additional testing.

- Consider providing incentives to teachers for their time and participation to ensure smooth implementation and assessment. Grant budgets might include funding for classroom equipment such as Google Cardboard VR viewers and gift cards for teachers.

To learn more about Streaming Science, visit the website to access past nonformal programs and follow the project's social media to learn about upcoming happenings: https://streamingscience.com/

References

Beattie, P. N., Kent, K. W., Suits, T. E., Loizzo, J. L., & Bunch, J. C. (2021). Bats and Beyond: Communicating wildlife and climate change empathy to youth through an electronic field trip. 71. Journal of Southern Agricultural Education Research. http://jsaer.org/2021/02/09/bats-and-beyond:-communicating-wildlife-and-climate-change-empathy-to-youth-through-an-electronic-field-trip/

Krebs C.L., Loizzo J.L., Stone W.A., & Telg, R.W. (2020). Scientist Online: Entomologists' experiences engaging with school audiences through Skype in the Classroom. Frontiers in Communication – Science and Environmental Communication, 5(576593). https://doi.org/10.3389/fcomm.2020.576593

Markowitz, D. M., Laha, R., Perone, B. P., Pea, R. D., & Ballenson, J. N. (2018). Immersive VR field trips facilitate learning about climate change. Frontiers in Psychology, 9(2364). https://doi.org/10.3389/fpsyg.2018.02364

National Academies of Sciences, Engineering, and Medicine (NASEM). (2017). Communicating science effectively: A research agenda. Washington, DC: The National Academies Press. https://doi.org/10.17226/23674

National Research Council (NRC). (2009). Learning science in informal environments: People, places, and pursuits. Washington, D. C.: The National Academies Press. https://doi.org/10.17226/12190

Seth, J. (2019). Scientists as storytellers guide: Expert advice for STEM communicators on how to make science stories more relatable. 3M State of Science Index. https://www.3m.com/3M/en_US/state-of-science-index-survey/

Stone, W., Loizzo, J., Aenlle, J., & Beattie, P. (2022). Labs and landscapes virtual reality: Student-created forest conservation tours for informal public engagement. Journal of Applied Communications, 106(1). https://doi.org/10.4148/1051-0834.2395

Wyndham, J. M., Anderson, M.S., Hinkins, S., Ericsen, J., Olson, A., Jeske, M., Liu, R., Weeding, J., & Jaffe, R. (2021). The Social Responsibilities of Scientists and Engineers: A View from Within. American Association for the Advancement of Science (AAAS).

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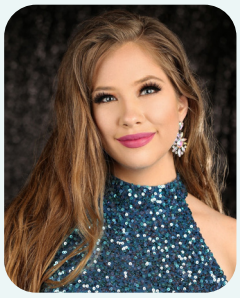

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Utilizing Socioscientific Issues in Farm-to-School Programming

by Dr. Sarah M. Cross

Farm-to-School programs have taken off throughout the country, as people become more and more invested with where their food comes from and how to produce it themselves. The National Farm to School Network (n.d.) claims that around 42% of U.S. schools have programs. These programs can focus in one to three areas: education, school gardens, and procurement (which involves getting local food in school cafeterias). In this article, I will discuss a framework that can be utilized to take the educational programs to the next level to help students navigate real world problems that are affecting our agricultural community, while enhancing their problem-solving skills. Nonformal educators, such as Extension agents, often implement exceptional farm-to-school programs. Within these programs, I believe there is an excellent opportunity for nonformal educators to collaborate with P-12 teachers to create meaningful curriculum that meets mandated science learning standards.

During my time implementing these programs, as a former Agriculture and Natural Resources Extension Educator, I found students often love growing their own food. I worked with various age groups, from preschool to high school, on educational farm-to-school programming and school gardens. This was my favorite part of the job, with my top experience working with a fourth-grade class. We utilized their small school greenhouse to grow lettuce and spinach in the winter. I also discussed the importance of local food with them. We talked about the economic, environmental, and health benefits of local food.

I will never forget sowing that seed with the first group of students. One student curled up her nose and said, "Ewww, spinach!" I laughed. The day we harvested the lettuce and spinach, they were so proud of their accomplishments, they were fighting with each other over who would take the bowl of greens to the cafeteria. About seven students ended up going together. The spinach and lettuce would be served in the cafeteria that day. During the next greenhouse session, I asked them how lunch was. The same little girl exclaimed, "I ate five bowls!," as she put up her palm with five digits. It was, and still is, one of the proudest moments of my career. I just couldn't believe that I could call this my job.

> Socioscientific issues (SSIs) are complex social issues, which are often controversial, that relate to science (i.e., climate change, land use issues, and the use of genetically modified organisms).

Farm-to-School and Critical Thinking

At the time, I had many colleagues implementing similar programs, but I couldn't stop thinking, "Is this enough?" and "how can we further engage students in critical thinking and problem solving?" I knew students were often not engaged in the traditional science classroom. Not only does literature suggest this but I have experienced it on many occasions. I was often bored and wondered how the information would apply to my life. I also knew some students, including secondary agriscience students, lacked critical thinking skills (Cross and Kahn, 2018). Again, literature suggests this, but I have also experienced it as an educator. Finally, I was also aware of our scientific literacy crisis in the U.S. So, why not utilize educational farm-to-school programs as a vehicle to promote scientific literacy, as well as problem solving and decision-making skills? This sounded great but I was unsure where to start.

I soon entered a science education doctoral program and was determined to find some answers. I learned about a framework that engaged students in real life science and promoted critical thinking, as well as problem solving. This educational framework is called socioscientific issues (SSIs). SSIs are complex social issues, which are often controversial, that relate to science (i.e., climate change, land use issues, and the use of genetically modified organisms). While SSIs have been quite successfully utilized in the field of science

education, there are only a few studies that unite the discipline with agriscience education (e.g., Shoulders & Myers, 2013; Wilcox, Shoulders, & Myers, 2014). Before long, my research would suggest the fields of study can mesh quite well, as many SSIs deal directly with agriscience.

Socioscientific Issues-based Curriculum

After completing a literature review, I learned the SSI framework can be utilized to challenge students to investigate food security, erosion control, genetically modified organisms, best management practices, climate change and more. Although it was fairly new territory for the agricultural education discipline, I thought I would give it a shot. I developed SSI-based curriculum on land use management, specifically erosion control, for an existing high school farm-to-school program. It was an environmental science class taught by an agriculture teacher who ran a school greenhouse. The SSI-based curriculum, which took two 45-minute class periods to implement, covered how to reduce nutrient runoff through conservation tillage practices and various sustainable agricultural practices. After receiving permission from the students' families to allow me to conduct research, I set out to introduce this agricultural SSI in the high school agriculture classroom. The first day included a good bit of direct instruction. Topics covered during the day are shown in Figure 1.

While the direct instruction was important, because the students had little background knowledge on this subject, I wanted to hear from the students and help them develop reasoning skills, which is common in SSI. Therefore, the second class session included a mock senate debate, which is an effective way to promote evidence-based argumentation and more sophisticated reasoning skills (Zeidler & Kahn, 2014). At the end of the first session, students were given a scenario related to harmful algal bloom and drinking water quality, which was an issue state officials were facing. Students were asked to address the issue of nutrient runoff in a mock Senate hearing activity. I told the class I would be representing the Senate, and students were randomly placed into four different groups, including a state environmental protection agency, citizens, farmers who practiced no till conservation tillage, and farmers that were against the no till method. Topics covered during the second day are shown in Figure 2.

So, what were the results? Students had a challenging time developing sound arguments, which was not surprising considering the material seemed too advanced for them. I could also tell this type of activity was very new to them. As I reflect on this experience, I think I should have co-created the curriculum with the Ag teacher, as she was obviously much more aware of their knowledge and experiences. The curriculum should have also been longer than two days, which is challenging considering the lack of time teachers have, due in part to the demands of learning standards. However, my SSI curriculum did align with science learning standards, as SSI often does. So, if nonformal educators work with teachers to develop curriculum, I believe it could be quite successful.

Nonetheless, I believe the SSI framework can be used to create curriculum for agriscience students that enhances critical thinking and problem-solving skills. Many nonformal educators are already doing such amazing hands-on work with students regarding farm-to-school programming and school gardens. SSI may be a good theoretical/educational framework to take this learning environment to the next level. Overall, I would advise nonformal educators to utilize well researched theoretical frameworks, such as socioscientific issues (SSI). I would also advise nonformal educators to collaborate with teachers on SSI-based curriculum and scholarly work (see Figure 3).

As for possible agricultural SSI topics related to secondary school agriscience, there are many that agriscience teachers could implement, such as: "Should agricultural producers use organic practices?," "Backyard poultry: to cage or not to cage?," "How should we address food insecurity

Day 1 - Lesson

- Introduction and consent forms
- Engaged with slides of flooded gardens and crop fields
- Introduction to the problem of soil erosion
- Discussion and videos showing conservation tillage practices
- Introduction to debate issue

Day 2 - Lesson

- Students read articles to prepare for the debate
- Review of agricultural content covered during day 1
- Debate: against no-till, pro no-till, US EPA. citizens
- Conclusion
- Post questionnaire

(TOP) Figure 1. Day 1 topics.
(BOTTOM) Figure 2. Day 2 topics.

Steps for Developing SSI-based Curriculum

- Determine a relevant SSI topic, which should:
  - Interest your students
  - Have various perspectives
- Find various articles that show the different perspectives
- Start the curriculum with a simple, applicable activity
- Cover various perspectives
- Develop a superior activity (e.g., debate, poster sessions, group presentations)
  - Students can be put into groups, representing different perspectives
  - Have the groups read the articles (or watch videos) regarding their perspective
  - Students will explain or debate perspectives
- Conclusion: Short summary of activities/arguments
- Have other colleagues look over the curriculum and make recommendations before implementation.

Figure 3. Steps for developing SSI-based curriculum.

in our community?," and "Animal Husbandry: feed lots or forage?" While some agriscience curriculum should address local community needs (Phipps et al., 2008), there are regional agricultural SSIs that could be utilized in Appalachia, such as "Autumn olive: an invasive plant to kill or to eat?" and "Multiflora rose: An invasive to spray or not to spray?" I would certainly encourage teachers to develop their own SSI questions for curriculum development and implementation. Better yet, perhaps students could be encouraged to help develop SSI questions or choose a topic from a list. This may further engage students in the content as well as help prepare them for the responsibility of land ownership and citizenship.

References

Cross, S. M., & Kahn, S. (2018). Science in the Garden: A Qualitative Analysis of School-based Agricultural Educators' Strategies. Journal of Agricultural Education, 59(4), 88-104. doi:10.5032/jae.2018.04088

National Farm to School Network (n.d). Retrieved May 5, 2021, from https://www.farmtoschool.org/.

Phipps, L. J., Osborne, E. W., Dyer, J. E., & Ball, A. (2008). Handbook on agricultural education in public schools. Delmar

Shoulders, C. W., & Myers, B. E. (2013). Socioscientific Issues-Based Instruction: An Investigation of Agriscience Students' Content Knowledge Based on Student Variables. Journal of Agricultural Education, 54(3), 140-156. doi:10.5032/jae.2013.03140

Wilcox, A. K., Shoulders, C. W., & Myers, B. E. (2014). Encouraging Teacher Change within the Realities of School-based Agricultural Education: Lessons from Teachers' Initial Use of Socioscientific Issues-based Instruction. Journal of Agricultural Education, 55(5). doi:10.5032/jae.2014.05016

Zeidler, D. L., & Kahn, S. (2014). It's Debatable!: Using Socioscientific Issues to Develop Scientific Literacy K-12. NSTA press.

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Lifelong Leadership Development through Nonformal Experiences

By Dr. Joy Morgan and Dr. Travis Park

"The truth is you make a difference. It is not a question of 'Will I make a difference?' Rather, it's the question of 'What difference will I make?'" (Kouzes & Posner, 2010, p. 4). As educators, we not only strive to deliver content in an engaging manner, but we also strive to develop effective leaders who will lead in their future careers and communities, hopefully making a positive, meaningful impact in our world. That impact varies depending on the individual's phase of life, and as educators we can play a significant role in strengthening the impacts our students will make. Leadership skills and characteristics, such as communicating effectively, building relationships, and solving problems, are evident in all aspects of individuals' personal and professional lives. Our methods of teaching these skills and providing experiences for practicing and honing them vary as a student progresses from high school to college and into careers. Nonformal education plays an instrumental role promoting and teaching leadership skills.

Leadership Development in the High School Ag Ed Program

Agricultural educators strive to create programs that are a unique balance revolving around the three-circle model often utilizing instruction, experiential learning, social/emotional activities, and community service. When we consider leadership development, it is often those experiences outside the classroom walls where our students are given opportunities to grow as individuals and embark on new challenges that increase their leadership skills and knowledge. FFA advisors market FFA as the premier leadership development organization for youth, so consider the following questions: What does that really mean? How do we structure leadership opportunities so that our FFA members develop skills and knowledge that will transfer to collegiate and community organizations? Are we developing "leadership" to win a CDE in the near future or are we thinking further into a student's future life? Throughout the year, we encourage our officers to seek federation, regional, and state leadership positions, but do we ever encourage, train, or facilitate workshops for them to think post-graduation about their service and leadership positions?

Hopefully, these questions challenge you to reflect on your program and as you begin thinking about a new school year, consider implementing activities that will prepare your students for post-graduation. Here are a few examples:

- Align your program of activities with the National Chapter Award, and create a working guide that places your officer team leading the charge. For homework prior to your POA meeting, invite your officer team to talk to five individuals about challenges they see facing their school or community. This step helps them become aware of community challenges and develop a community service event that will have an impact. It also may lead to community partnerships that will encourage post-graduation participation.
- When planning a trip to a Convention, teach students how to find flights, bus companies, and restaurants for large groups. Provide a budget and encourage your students to seek out the best plan through the analysis of reviews and research. These are lifelong skills that will benefit students in the future.
- When developing and delivering community service projects, coach your students through the leadership processes of setting goals, planning, contacting necessary partners, and evaluating the success of the project. Seniors should be able to independently plan and deliver such a community-based service.

Leadership at the Collegiate Level

At the college and community level, student organizations need capable leaders who have good knowledge and skills related to the fundamentals of functioning organizations. Effective and sustainable organizations must be financially sound, involve members, deliver impactful events and programs, and have a leadership structure that transcends the turn-over of leadership. Fundamental skills include budgeting, creating meeting agendas, setting calendars, planning events and activities, communicating effectively, understanding parliamentary procedure basics, and transitioning leadership.

Collegiate club advisors exercise less direct instruction of the club than typical high school FFA advisors do with their FFA chapters. However, club advisors

expect that officers lead and sustain the organization. Even with less direction for club advising, advisors may need to reinforce expectations for officers.

- The regular meeting of a club is a necessary maintenance function. Officers should understand their responsibilities including meeting to plan the regular meeting agenda and including possible action items within the agenda.
- Club advisors can help collegiate student leaders develop transition plans to provide for leadership continuity and continual improvement. Officer handbooks and organizational operating procedure documents are critical in these areas.
- Most collegiate clubs manage their own finances. Club advisors should teach officers about budgeting and managing funds that are not their own.
- Often club leaders juggle multiple obligations for academics and extracurricular organizations. Club advisors may need to help officers navigate and balance this complex ecosystem of responsibilities.

Leadership in Communities

As career professionals, our former students are yet again attempting to balance a new three circle model of their own. These three roles (individual, career, family) are integral to who they are as a person, but again depending on their stage in life may vary from individual to individual. However, with the many challenges facing agriculture and communities today, strong leaders at all levels are needed.

When considering the role of an advisor, it is a role that never stops. Whether you are a FFA advisor, university advisor, or a community member, it is our responsibility to recruit and encourage leadership development within those who may view us as a mentor. Within most states, there is an agricultural leadership development program housed at a university that seeks to further develop personal and professional leadership skills among agriculturalists in hopes these individuals will serve on community boards, commodity organizations, and local governments. These programs utilize personal assessments, such as Myers-Briggs, Emotional Quotient Inventory, and Kirton Adaption Innovation Inventory, so participants can learn about their personality preferences, emotional intelligence, problem-solving abilities, teamwork, and creativity. By understanding their preferences and strengths, participants have a greater understanding of where they can best serve in leadership roles.

In addition, these programs often train participants in Crucial Conversations, furthering the ability to address difficult conversations that occur in families, careers, and communities as well as advocating for agriculture. Farm Bureau, The Grange, commodity organizations, Extension, and county-based programs are a few other examples of groups who host nonformal educational opportunities for adults to engage in leadership development. Knowing that early, mid, and late career professionals are juggling many

2017-2019 Graduates of the North Carolina Tobacco Trust Fund Commission Agricultural Leadership Development Program. Many of these graduates are also alumni of NC State University and former NC FFA members.

roles and responsibilities, how do we encourage our alumni to take advantage of these opportunities?

- Create a master list of student names, emails, phone numbers, and careers/interests. When you learn about an opportunity, forward it along with a personal note as to why you think this would be a good opportunity for them.
- On your social media page (work or personal), share the accomplishments of former students who complete leadership programs. This will encourage other students to look into programs and participate. Publicity also gives the individual recognition which will create a stronger support of your program.
- Program directors should constantly reflect on your program and the current needs of the participants. Each cohort will vary and it is important to consider their goals and reasons for participating in the program.
- Once a year, plan an alumni event to promote professional development and networking. This session should contain both social and learning opportunities that are designed to foster stronger relationships within your alumni group. Further, it shows the program is committed to supporting alumni and lifelong learning.

Small changes to our programs can create bigger impacts if we are strategic in creating learning opportunities that encourage future and lifelong leadership development. As the year comes to a close, think about those areas where you can change your activities to prepare students for the next stage of their life. It could make the difference in developing the next generation who will lead agriculture within your state, our nation, and the world.

References

Kouzes, J. M., & Posner, B. Z. (2010). The truth about leadership: The no-fads, heart-of-the-matter facts you need to know. John Wiley & Sons.

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The Importance of Project-Based Learning for Strengthening Program Development and Evaluation Skills in Nonformal Educators

by Rose Judd-Murray

Nationwide, land-grant extension programs are hiring many graduate students—particularly those that have expertise in nonformal or community-based education. Extension programs have expanded their efficacy by deliberately focusing on program planning and evaluation methods that measure the outcomes of their interventions. Extension evaluation specialists use statewide needs assessments, client satisfaction surveys, in-service trainings, and make widely available evaluation indicators and templates to support county and regional employees. It is clear that obtaining program outcomes and impacts are organizational priorities. Moreover, ensuring community members, political representatives, and stakeholders can see the direct significance of extension programming is essential to the ongoing funding and support of the organization.

One of the best ways to support graduate students with a career trajectory towards extension or similar nonprofit work, is to strengthen their ability to develop, implement, and evaluate programs using a needs assessment and logic model. They serve as foundational elements of problem analysis and the intervention evaluation approach. Programs that use both are more likely to have an established plan for how the inputs and activities will be evaluated from the short-term to the long-term. Furthermore, utilizing project-based learning (PBL) as a framework immerses students in real-world problems and lets them seek solutions that meet the complexities of community needs.

> Conducting a needs assessment, using those results to plan a program, developing measurable indicators of program success or failure, distinguishing between program outputs and outcomes, and creating an evaluation plan during program planning.

Real-World Collaboration

The idea for this graduate-level coursework, centered in PBL, came from an internal 2019 USU Extension report titled, *Essential Competencies for Early Career Faculty.* It identified job-specific competencies crucial for providing the nonformal education needs of Utah stakeholders and clientele. The report overwhelmingly highlighted program planning, implementation, and evaluation skills—including conducting a needs assessment, using those results to plan a program, developing measurable indicators of program success or failure, distinguishing between program outputs and outcomes, and creating an evaluation plan during program planning. Integrating the report information as a professional development opportunity for extension agents to mentor potential future employees (graduate students), became a win-win for improving their own planning and evaluation skills while sharing institutional program knowledge with adult-learners eager for relevant, bona fide problems.

The course instructor identified agents and/or specialists, who then agreed to serve as project mentors. Their role was to allow the students to interview them, ask about current programs, inquire about community needs, and assist students in identifying either a new program or existing program improvement. Students, in small groups (4-5), selected an extension program mentor and were tasked with working with their mentor via Zoom to develop a needs assessment, logic model, and program proposal that included an evaluation plan.

Student coursework assignments were divided into three phases of development. Each of

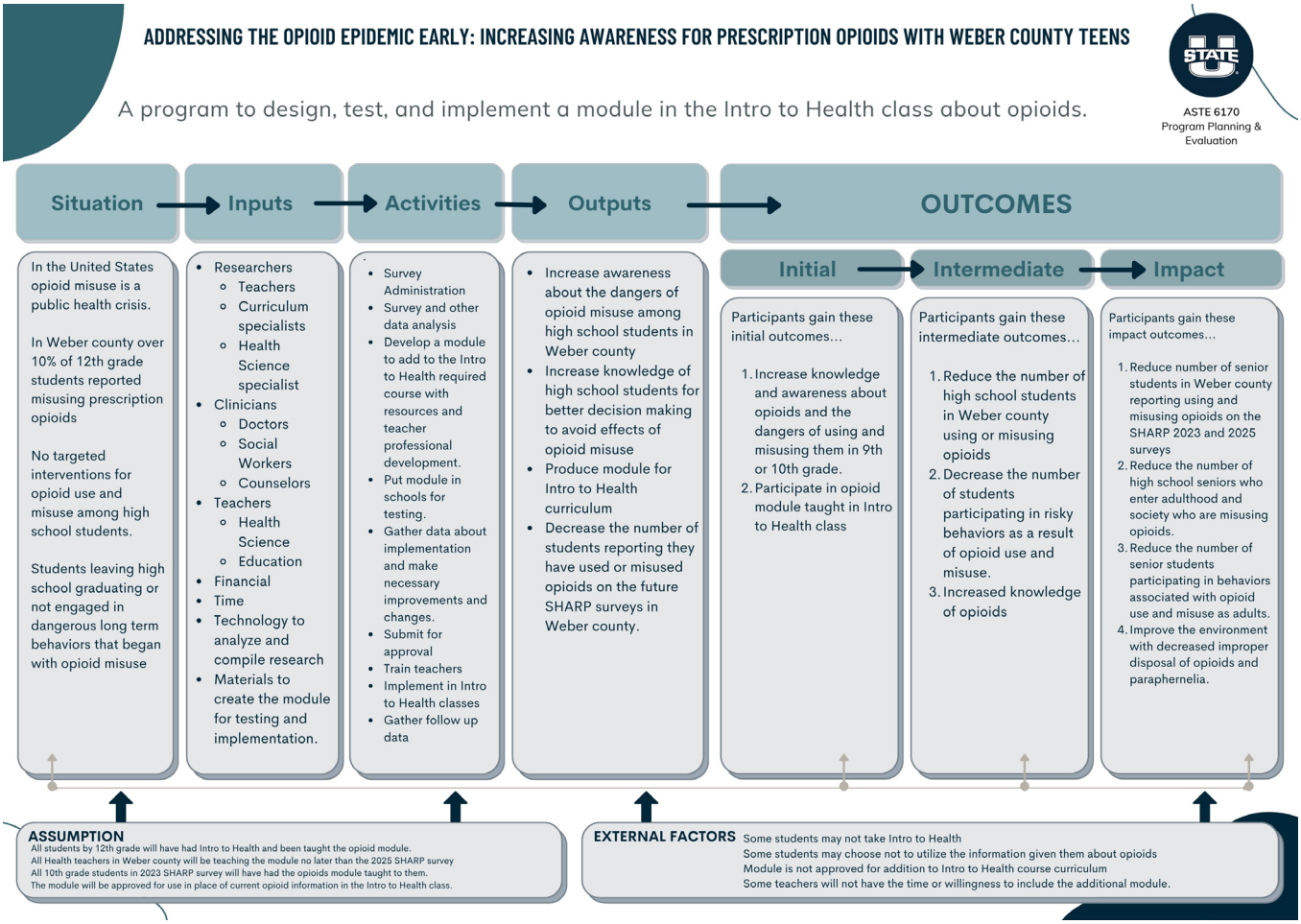
the phases scaffolded the work of program planning (i.e., problem statement, needs assessment, logic model) and evaluation (i.e., survey development, measurables, proposal). The Program & Proposal Enhancement Guide from Oregon State University Extension served as a key instructional tool for guiding the students in the process.

"As a general rule, Extension enjoys and has strong abilities to develop and deliver programs. We often come up short in the front and back of the program planning and evaluation. Increasingly, the need to present detailed program impacts is essential for programs. Understanding how to conduct a needs assessment to determine the kind of program offering and how to evaluate the program to measure the difference we are making in a program is essential. Working with [these students] helps Extension have additional insight into programs and builds the skill set of potential future employees." - Dave Francis, USU Extension Youth Development Director and PBL Project Mentor (2021).

Phase I: Pre-assessment

Teams began by identifying a team leader and completing a review of the latest statewide needs assessment results. The team leader became the primary contact with the extension mentor to reduce confusion and establish a singular point of contact. Students used their time with their mentor to gain understanding about existing programs and problems. Once the team selected a focus area and developed a problem statement, they examined data from prior surveys, completed a basic literature review, and synthesized population datasets. The mentors assisted them in recognizing key pieces of information and determining relevant and available sources of *need* evidence. Students submitted their initial report that contained an analysis of the 1) current situation, 2) possible solutions to reduce the gap between "what is" and "what should be," and 3) the possible consequences for not bringing the current situation in line with the desired situation. The report was supplemented with sufficient evidence to validate their analysis and citations.

Graduate student work groups developed logic models as a part of their integrated program planning coursework with a Cooperative Extension mentor.



Phase II: Assessment

The second part of the assignment afforded students the experience of utilizing an agent's community network to collect new and additional information about the "what is" and "what should be" conditions, consequences, and causes. Many teams focused on conducting interviews, short surveys, or utilizing a focus group approach to gain depth and scope on how to best develop and evaluate a potential intervention. Teams used detailed feedback received from Phase I as a scaffold for strengthening their needs-based decisions. The submissions allowed students to improve their first drafts, while continuing to gain information necessary for a final proposal submission.

> *"The program we worked on together was seeing a decline in participation. The graduate students helped recruit over 100 respondents of the target audience. The data collected has informed significant changes to the program, and while I could have done this myself, it would have taken longer, and I would not have experienced the positive [aspects of] mentoring them. They brought so much value to the process with their unique perspectives, contacts, and experience. I highly recommend other Extension faculty work on similar project-based [learning]." - Dr. Paul Hill, USU Extension Director for the Rural Online Initiative Program (2021).*

Phase III: Posst-assessment, Program and Evaluation Plan

The final phase of the PBL experience asked students to take their plan and convert it into a program proposal that could also be used as a grant proposal. Phase II (and detailed feedback) served as a foundation for the program narrative and evaluation section. The rubric asked them to articulate the causes of high-priority needs, convert their causes into solutions, and prioritize their solutions based on feasibility. Course lectures introduced the purpose and framework of a well-developed logic model and the process of producing a line-item budget for their work. The students also used the Targeting Outcomes of Programs (TOP) Model and Societal, Economic, and Environmental (SEE) conditions for identifying long-term outcomes and impacts. The final 15-page submission was a practice-based effort centered in professional competencies.

Results & Student Feedback

It can be difficult to get consistently positive feedback from all team-based or group work, but the meaningful project-based efforts resulted in student comments stated that working as a group was difficult at times, but the challenges did not overshadow the importance of the work. Students valued the experience of working alongside a community educator and program leader. They also acknowledged the learning curves associated with logic model development, line-item budgeting, and crafting an evaluation plan for the first time were more intense than anticipated. Again, they stated working through the process with a small group enabled them to produce a stronger proposal and more objectively view the feedback received from the instructor. Lastly, students self-reported they felt more confident in their ability to complete these tasks and had greater ability to work with a group to develop an intervention to meet a community need. All students stated they were unaware of the level of complexity and effort necessary to complete a program and evaluation plan, with an improvement in their understanding of the critical steps for best practice.

> *"This was a challenging project but provided a real-life experience I may face in the future. It allowed me to make some mistakes that could be corrected when money and other things were not on the line." - Graduate student comment from course evaluation*

> *"The assignment [for this course] was relevant and realistic. It was fascinating to dive into an actual Extension program to assess needs and come up with a program to address the need. It is obvious that this [type of instruction] is designed with learning goals in mind, with a focus on real-life application." - Graduate student comment from course evaluation*

References

Oregon State University. (2022). Needs Assessment. Retrieved May 3, 2022, from https://employee.extension.oregonstate.edu/resources/evaluation-assessment/needs-assessment

Harder, A. M. (2009). Using the TOP model to measure program performance: A pocket reference. Retrieved from, https://edis.ifas.ufl.edu

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Maintaining Campus-Community Relationships Through the Use of Extension Internships

by Dr. Haley Rosson

The Importance of Extension Internships

Enacted during an extremely tumultuous time in our country's history, the Morrill Land-Grant Acts of 1862 and 1890, the Hatch Act of 1887, and the Smith-Lever Act of 1914 culminated to form the tripartite mission of the land-grant university system, built on the foundations of teaching, research, and Extension. This envisioned symbiotic relationship was designed to bring the university directly to the constituents of each state, enabling educational accessibility to all. In recent years, researchers have argued that land-grant institutions have veered away from the research and extension that directly serves its mandated constituency (Fields, Holberg, & Othman, 2003; Trexler, Parr, & Khanna, 2006), with a notable call to either renegotiate or abandon the social contract (McDowell, 2001) precedented by Extension. At the university level, and of particular significance to this author, West Virginia University President, Dr. Gordon Gee, along with co-author, Dr. Stephen Gavazzi of Ohio State University, have recently called for efforts to revitalize the "covenant" that exists between the public and land-grant universities, instilling strong "campus-community" relationships (Gavazzi & Gee, 2018; Harvard Educational Review, 2020).

According to the American Association for Agricultural Education's 2016-2020 National Research Agenda, providing a "sufficient scientific and professional workforce that addresses the challenges of the 21st century" (p. 3) is a key research priority (Roberts, Harder, & Brashears, 2016). Additionally, the research agenda aims to contribute to the rejuvenation of "vibrant, resilient communities" (Roberts et al., 2016, p. 3), by examining and addressing rural to urban migration and the subsequent declines in population, businesses, and jobs (Economic Research Service, USDA, 2019).

> This program aims to provide university undergraduates with the opportunity to gain first-hand expertise in the Extension profession through an experiential, supervised internship experience

In order for any organization to remain viable, a renewable source of personnel must be available, and the Cooperative Extension Service is no exception (Seevers & Dormody, 2010). As the Extension Service has evolved and expanded since its inception in 1914, so too have the roles and responsibilities of Extension agents (Seevers & Graham, 2012). According to Suvedi and Ghimire (2015), "the need and demand for Extension professionals to demonstrate a higher level of professionalism in their services is growing" (p. 1). In 2002, the Personnel and Organizational Development Committee (PODC) of the Extension Committee on Organization and Policy (ECOP) conducted a synthesis from several state's Extension programs to identify the core competencies all Extension professionals should possess (Maddy et al., 2002). The following 11 areas of core competencies were identified: 1) Community and social actions processes; 2) Diversity/pluralism/multiculturalism; 3) Educational programming; 4) Engagement; 5) Information and education delivery; 6) Interpersonal relations; 7) Knowledge of the Cooperative Extension organization; 8) Leadership; 9) Organizational management; 10) Professionalism; and 11) Subject matter (Maddy et al., 2002).

One way to ensure future agents are acquiring the competencies necessary to be an effective agent, as well as ensure the continuation of the Extension profession, is through the use of supervised internship experiences. However, while the concept of having students complete Extension-based internship experiences is not new, a surprising number of students at land-grant institutions are often unaware of the existence of Extension and the outreach services the organization provides to local communities (Grotta & McGrath, 2013). Grotta and McGrath (2013) suggested Extension-based internships can help Extension "reach new audi-

ences; leverage scarce resources; provide meaningful, community-based work experience; and perhaps recruit another generation of Extension professionals" (para 1). Additionally, Extension internships have been found to provide meaningful experiences for not only the intern, but also the agent, allowing for the opportunity to update knowledge and skills (Wilken, Williams, Cadavieco, & Walker, 2008).

The Agricultural and Extension Education discipline is rooted in experiential learning, and with Extension's close ties to local communities, it is a natural fit for experientially-based learning opportunities (Johnson, Vera, Irvin, & Elliott, 2019). By shadowing agents in a county Extension office, students gain the relevant skills necessary to become an effective agent, including the essential tenets of Extension program development: 1) Planning, 2) Design and Implementation, and 3) Evaluation (Seevers & Graham, 2012).

The Extension Summer Internship Program at WVU

In an effort to answer the call to create strong campus-community relationships and also contribute to a sustainable source of Extension personnel, the first official WVU Extension Summer Internship program was created in 2021. This program aims to provide university undergraduates with the opportunity to gain first-hand expertise in the Extension profession through an experiential, supervised internship experience with the West Virginia University Cooperative Extension Service. The internship program is a joint initiative between the Agricultural and Extension Education academic department at WVU and the WVU Extension Service.

Through participation in the program, interns become immersed in the daily workings of a county Extension office and spend time shadowing each of the county agents - typically each county has an Agriculture and Natural Resources, 4-H and Youth Development, and Family and Community Development agent - in an effort to learn the multi-faceted roles of Extension. In addition to the work requirements of the internship, students are also expected to develop/lead an educational project, as well as prepare a final internship portfolio and presentation, showcasing key activities the intern led or developed. At the conclusion of their internship, students also complete a performance appraisal with their direct supervisor, similar to an agent's yearly performance review.

WVU Extension Intern, Garrett Vaughn, assisting Greenbrier County Agriculture and Natural Resources Agent, Joshua Peplowski, at the county's high tunnel demonstration.

Application and Selection Process

Loosely based on the university student teaching placement process, both interns and host counties complete a reviewed application process for admittance to the program. Applications are first submitted by county Extension offices wishing to serve as a host site and are then vetted to determine feasibility of location, current office structure (number of agents currently in county), agents' numbers of years in Extension, and ability to serve in a supervisory/mentoring role.

After host county sites have been selected, intern applications are accepted, with a list of participating host counties provided. In the application, students indicate a preference for up to three counties for placement. Applications are first reviewed by the project directors, then applicants participate in a virtual interview with the program directors and agents from the host county sites where students have indicated placement preference, to determine level of interest in the position, experience working with different groups of clientele, previous teaching experience, and leadership/communication qualifications. After the interview process is complete, selected applicants are matched with a county office. Prior to beginning their assignment, interns also complete a mandatory orientation training.

WVU Extension county, or "field-based," agents serve as mentors to the student interns. Interns have the opportunity to

work directly with each agent in the county office to learn about and experience educational efforts for the three programmatic areas in WVU Extension: 1) Agriculture and Natural Resources; 2) 4-H and Youth Development; and 3) Family and Community Development. One agent in each county is designated as the intern's direct supervisor and works with the intern to develop a work schedule for the semester, as well as a budget for the stipend that is allotted to each county office for the intern's work-related expenses.

Internship Experiences

The objective of this project is to provide support for undergraduate and graduate students who are interested in pursuing an eventual career with the Cooperative Extension Service through both hands-on experiential training and classroom-based instruction. Interns become immersed in the daily workings of a county Extension office and spend time shadowing each of the county agents in said office in an effort to learn the multi-faceted roles of Extension. As respected change agents within their communities, agents are able to introduce their students to key opinion leaders who influence the flow of communication and help identify the most pressing needs affecting their county. By identifying these needs, students can then begin to determine what sort of educational/programming efforts can demonstrate the most impact.

In helping to develop the students as future educators, mentors work with each student to identify an educational programming opportunity, based on needs identified by clientele within their communities, the student will then coordinate and lead. These teaching opportunities also include the creation of tangible materials, such as curriculum booklets, newsletters/articles, flyers, presentation slides, or manuals. Examples of teaching/programming opportunities could include leading a 4-H SPIN (special interest) club, facilitating an agricultural field day/farm tour, or teaching a healthy outdoor living workshop for a local Extension Community Educational Outreach Service (CEOS) club.

As interns spend time shadowing each of the agents in a county office, they experience a wide variety of activities such as assisting with 4-H camps, attending/facilitating producer meetings, visiting local ag clientele, teaching youth workshops/day camps, attending county commissioner and Fair Board meetings, visiting local 4-H clubs and attending volunteer meetings, and assisting with livestock show and county fair preparations. All interns are also encouraged to attend various professional development opportunities and/or relevant conferences with their supervisor/mentors.

(LEFT) WVU Extension Intern, Mikayla Hargis, and Berkeley County 4-H and Youth Development Agent, Michael Withrow, at the Berkeley County Fair. (RIGHT) (from left to right) Amanda Johnson (Jefferson County 4-H and Youth Development Agent), Ryan Snyder (WVU Extension Intern), and Emily Wells Morrow (Jefferson County Agriculture and Natural Resources Agent).

In addition to students' direct Extension-related experiences, they also concurrently complete the AGEE 491 – *Professional Field Experience* course, offered through the Agricultural and Extension Education department at WVU. This allows them the opportunity to actively reflect, conceptualize, and experiment on their current experiences, thus allowing for continual iterations of the experiential learning cycle (Kolb, 2015).

At the conclusion of their experience, students submit a final internship portfolio, showcasing key activities the intern has led or developed, as well as a final in-person and/or virtual presentation to be given at the completion of their internship experience. A scheduled site visit (1 visit per intern during the 12-week internship period) is also conducted, providing an opportunity for each intern to showcase efforts they have undertaken while in the position, as well as reflect on their experiences.

The Big Picture of Extension

At the conclusion of the first iteration of our program, we conducted focus group sessions with both interns and supervisors. In terms of understanding Extension and the work that Extension agents do, both interns and agents agreed this experience afforded the opportunity to gain a better grasp of "the ins and outs" and "key pieces of Extension that can't be taught in a classroom." From the student perspective, interns indicated they "…now have a much better idea of what Extension does," including the freedom and flexibility agents have when it comes to programming. After their experience, students also indicated increased interest in pursuing a career with Extension. One student stated, "My interest is much higher now […] There were times I felt during my experience that I may have missed my calling."

Agents echoed many of the students' comments, including the often repeated adage, "Every day is different," but also acknowledged the students recognized many of the additional responsibilities agents bear, such as interacting with parents and volunteers, or preparing county budgets. When speaking with agents, they quoted students as saying, "I didn't know you had to deal with stuff like this," or, "You guys do a lot!" The experience also afforded interns the "opportunity to help define their passion" and "allowed for individuality" in programming. Agents agreed the experience was also very beneficial for students interested in research (several students assisted with field variety trials) or potentially pursuing a graduate degree.

As this was the first iteration of the joint Extension internship, there were naturally suggestions for improvement and ideas for additional learning opportunities. Both interns and supervisors noted frustration with the payroll arrangement, indicating that the "campus 8-5, Monday-Friday" workweek and payroll schedule was not truly reflective of an agent's schedule (i.e., working evenings, weekends, etc.). It was suggested that a phone etiquette lesson would be beneficial to offer to interns during a pre-orientation session before being sent out into the county. Agents also indicated several additional learning opportunities for interns to experience, such as attending a county commissioner/fair board/Extension service committee meeting or participating in trainings or other professional development opportunities with their agents.

References

Economic Research Service, United States Department of Agriculture. (November, 2019). Rural America at a glance. Economic Information Bulletin No. (EIB-212). https://www.ers.usda.gov/webdocs/publications/95341/eib-212.pdf?v=6525.2

Fields, A. M., Holberg, E., & Othman, M. (2003). Changes in colleges of agriculture at land-grant institutions. NACTA Journal, 47(4), 7-15. https://www-jstor-org.www.libproxy.wvu.edu/stable/43765799?seq=1#metadata_info_tab_contents

Gavazzi, S. M., & Gee, E. G. (2018). Land-grant universities for the future: Higher education for the public good. Baltimore, MD: John Hopkins University Press.

Grotta, A., & McGrath, D. (2013). The role of internships in raising undergraduates' awareness and perception of Extension. Journal of Extension, 51(4). https://joe.org/joe/2013august/rb2.php

Harvard Educational Review. (2020). Land-grant universities for the future: Higher education for the public good. https://www.hepg.org/her-home/issues/harvard-educational-review-volume-89-number-2/herbooknote/land-grant-universities-for-the-future

Johnson, T., Vera, T. D., Irvin, V., & Elliott, K. (2019). Engaging college students in experiential learning opportunities within Extension. Journal of Extension, 57(2). https://www.joe.org/joe/2019april/iw1.php

Kolb, D. A. (2015). Experiential learning: Experience as the source of learning and development. United Kingdom: Pearson Education, Incorporated.

Maddy, D., Niemann, K., Lindquist, J., & Bateman, K. (2002). Core competencies for the Cooperative Extension system. https://apps.msuextension.org/jobs/forms/Core_Competencies.pdf

McDowell, G. R. (2001). Land-grant universities and Extension into the 21st century: Renegotiating or abandoning a social contract. Ames, IA: Iowa State University Press.

Roberts, T. G., Harder, A., & Brashears, M. T. (Eds). (2016). American Association for Agricultural Education national research agenda: 2016-2020. Gainesville, FL: Department of Agricultural Education and Communication. http://aaaeonline.org/resources/Documents/AAAE_National_Research_Agenda_2016-2020.pdf

Seevers, B., & Dormody, T. J. (2010). Turning an Extension aide into an Extension agent. Journal of Extension, 48(6). https://www.joe.org/joe/2010december/iw1.php

Seevers, B., & Graham, D. (2012). Education through cooperative extension (3rd ed.). University of Arkansas Bookstore.

Suvedi, M., & Ghimire, R. (Eds.). (2015). Core competencies for agricultural extension-educators (Project No. AID-OAA-L-12-00002) [Grant brief]. InnovATE – Innovation for Agricultural Training and Education. https://innovate.cired.vt.edu/wp-content/uploads/2015/09/Suvedi-Thematic-Brief-.pdf

Trexler, C. J., Parr, D. M., & Khanna, N. (2006). A delphi study of agricultural practitioners' opinions: Necessary experiences for inclusion in an undergraduate sustainable agricultural major. Journal of Agricultural Education, 47(4), 15-25. doi: 10.5032/jae.2006.04015

Wilken, C. S., Williams, B. C., Cadavieco, N., & Walker, D. K. (2008). Student internships in extension: Strategies for success for the agent and the student. Journal of Extension, 46(4). https://www.joe.org/joe/2008august/tt3.php

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The Power of Planning an Agriculture Tour

by Jillian Ford

As agricultural educators, we have the unique opportunity to provide our students with formal and nonformal learning experiences throughout the year. During my time as a high school agricultural educator, one of my favorite nonformal learning experiences I offered my students was an agricultural awareness tour that took place over three days during the summer. This tour was inspired by the many tours I had taken during my youth, education, and professional career.

One of the highlights of my master's degree was a class called "Traveling Seminar'' that took us on a five state tour of agricultural education programs, extension programs, and agribusinesses. The format of the week kept participants actively learning about how the different programs functioned within their respective states and shared ideas that the participants could apply in their careers. While the focus and formality of each tour differed, I walked away with a new perspective and appreciation for what I had learned and experienced. My teaching partner and I realized that planning an ag tour, similar to the Traveling Seminar, for our students could be a powerful way to combat the increasing gap in agricultural literacy, introduce students to local agriculture, introduce the community to our students, and possibly inspire a student to choose a career path. An ag tour would present students with a new perspective and provide them with a better understanding of agriculture in our area.

(TOP) Participants learn about turfgrass management careers and responsibilities at a local minor league baseball stadium. (BOTTOM) Participants explore the campus greenhouse facilities at NC State University while learning about the role of horticultural researchers in the green industry.

My teaching partner I reached out to the agriculture teacher at our neighboring high school and collaborated to develop a schedule for our three-day tour. We chose to spend two days touring agricultural facilities in surrounding counties and one day in our home county. We averaged two to three stops daily and covered a variety of agricultural enterprises and post-secondary agricultural education programs. We took an activity bus, limiting participation to the number of students we could fit on the bus, and had matching shirts made for the students who were sponsored by our county Farm Bureau. Our main goal was to expose our students to the plethora of agricultural careers available close to home. We were excited to create an opportunity that not only introduced our students to local agriculture but directly connected to career exploration in their foundational SAEs. We even encouraged students to count these hours in their record books which allowed them to make progress towards earning their FFA degrees. Along with our students, we looked forward to traveling and learning on the ag tour each summer.

After our first ag tour, we developed a planning system that worked for us. Hopefully, this system will benefit other instructors who are considering implementing an ag tour in their programs.

Tips for planning a successful ag tour:

1. **Decide the purpose of the tour and set goals.** What do you want your students to see and learn? Do you want to provide students with experiences related to local agriculture? Do you want to expose students to potential agricultural careers? Do you want students to learn more about potential agricultural colleges or degrees? Are you trying to foster an appreciation of local agriculture in your students? Is the tour meant to be a chance for students to see agriculture in a different environment?
2. **Brainstorm.** Identify specific areas of agriculture you want students to experience and identify potential businesses and community members to help lead or plan the tour. Think of the community contacts you have. If you are new to a community, consider partnering with another local ag program for the tour or reach out to cooperative extension staff or other local stakeholders familiar with the community.
3. **Create a game plan.** When will your tour be? How many days? How many stops each day? How far are you willing and able to travel? Does it involve overnight stays? Do you need additional chaperones? What meals will be involved? What type of transportation is needed? What is the maximum number of students you can take? How will the costs be covered?
4. **Communicate.** Reach out to places you would like to tour and present potential dates and times. Be sure to provide a picture of what you would like for your students to experience. Ex: hands-on activity, overview of the business, how a certain activity takes place, walking tour, etc.
5. **Advertise to students.** Make sure your students know what to expect on the tour and get them excited and signed up ahead of time.
6. **Follow-up.** Be sure to follow up with the confirmed tour stops roughly a week in advance. Be sure to reiterate your planned time schedule and hopes for student takeaways.
7. **Go on the tour.** Just like any field trip, be prepared for anything! Be sure to take pictures and share them with your stakeholders. Remember these agriculturalists are often taking time out of their busy schedules to allow your students to visit, so be sure to send thank you notes to those who led the tour stops or helped with the tour. This is a great chance for students to practice their thank you note writing skills.
8. **Reflect.** Take the time to reflect on the successes (and areas to improve upon) from the tour. Make notes to inform your planning for the next one. Get feedback from students about their likes and dislikes of the tour.

While putting together an agriculture tour can be time consuming, I believe the student growth and community interaction are worth the investment. Once you have planned and taken one tour, it is easier to prepare for the future and see what works for your program and your students. I sincerely hope you will commit the time to plan an ag tour for your students in the future! Not only will your students get to see more agriculture in action, be exposed to possible careers, and make memories with their peers, but you will also "develop professionally through study, travel, and exploration" just as we are charged to do in the Ag Teacher's Creed.

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Agricultural Education: No Boundaries

by Patricia Jordan, Heather Nesbitt, Natalie Money, & Dr. Debra Barry

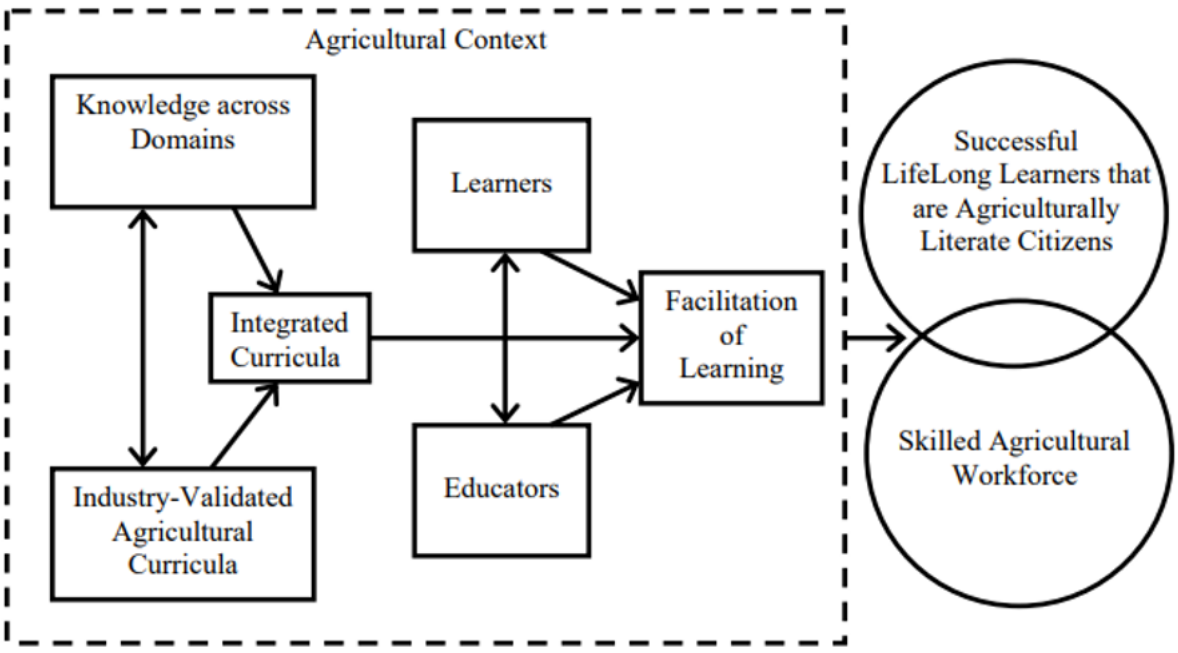
Before formal agricultural education existed, the public was educated through nonformal experiences (Barrick, 1989). The purpose of education was to teach problem solving through a "learning by doing" philosophy and allowed students to reach self-actualization and independence (Cupp, 1988). However, agricultural education has historically been pulled in many directions, with the Prosser way of educating (formal education) creeping up repeatedly. As we look to the future, will the goal be for students to continue down a Prosser style Career and Technical Education (CTE) path? Or could the goal be for our students to be well rounded individuals who learn about life through formal and nonformal educational experiences that more closely follow Dewey's "learning by doing" philosophy?

Nonformal education calls for creating space in education that is non-traditional and allows for lived experiences to be shared. Graham (1994) discusses that the future of extension is to continue to help people help themselves. This leads to the question, what is the philosophy or intent behind agricultural education? Smith (1991) states the philosophy of extension (nonformal education) and land grant institutions (formal education) is "meeting the needs of the people by using the latest research, teaching for application, and practical problem solving." There is value in connecting formal education (FFA) and nonformal education (4-H) entities to work jointly with each other to educate youth and communities about agriculture.

The purpose of agricultural education extends beyond the historically polar perspective that was proposed by early philosophers Dewey and Snedden (Roberts & Ball, 2009). The influence and intention to educate youth and adults of all ages about the agriculture industry does not fit neatly within the categories of formal and nonformal, or how these might align. There is much we can take with us from the past, and an opportunity to think about how to come together for the greater purpose of teaching and learning. Roberts and Ball (2009) conceptualized a model for how agricultural subject matter can be a content and context for teaching (Figure 1). The goals for agricultural education, whether formal or nonformal, seek to not only foster a skilled agricultural workforce, but also to help create successful lifelong learners who are agriculturally literate (Roberts & Ball, 2009).

It is important to note that as we learn from the past, we consider the philosophies and

Figure 1. Conceptual model for agricultural subject matter as a content and context for teaching (Roberts & Ball, 2009).



legislation that has impacted agricultural education. Throughout history, as legislation rapidly changed, there was a lack of forethought around the inclusion of diverse populations. For example, underrepresented populations have lacked representation in a broad sense. This imposes a bigger question: how can our past help to transform the future of agricultural education?

Our Vision of the Future:

> "History, despite its wrenching pain, cannot be unlived, but if faced with courage, need not be lived again."
> *- Maya Angelou*

Fast forward to 28 years from now, it's 2050 and we are entering the blueberry cropping season in Florida. There are a group of 4-H and FFA students, who are working together to learn in the field. Their programs are aligned, and their advisers are working together to enhance their education in agriculture. The facilities at this site have advanced technology that can provide knowledge about the field, fruits, and weather conditions at the touch of a button, allowing the staff on site to best manage this crop. The students are familiar with this technology, as they were first introduced to it in middle school during their general study programs that included agricultural education as part of their normal academic coursework.

The leaders on this site are three women, who are from diverse backgrounds and who have owned this land for 20 years. This was made possible with the reforms through USDA (United States Department of Agriculture), such as the Black Farmers Act that was passed in 2023. This legislation allowed the USDA, to correct some wrongs by providing funding and land to Black farmers who were previously denied these services. The legislation addressed the following areas: end discrimination within USDA, protect Black farmers from land loss, restore land lost by Black farmers, create farm conservation corps, empower HBCUs (historically Black colleges and universities) and advocate for black famers, assist socially disadvantaged farmers and ranchers and enact system reforms to help all farmers and ranchers. This allowed for training and investment in the National Black Farmers Association, to ensure farmers have the tools needed to succeed. Another program that assisted with this diverse representation, is a USDA/National Institute of Food and Agriculture (NIFA) program for experiential learning opportunities and funding to African American youth to participate in on-farm and off-farm activities.

With the increase in technology and diversity within agricultural education, there is a higher number of agricultural students graduating and entering the agricultural field. Agriculture is also seen in the U.S. industry as an essential need and amongst the competing academic pursuits that will allow for the U.S. to be a top leader amongst other countries. Agricultural education is innovative and flexible, as there is an acceptance of non-agriculture backgrounds that have influenced the philosophical evolution of agricultural education. By 2050, agricultural education has advanced and diversified with ample room to continue to grow.

"My experience as a high school agriculture teacher and FFA Advisor, the collaborative efforts with Extension and 4-H always strengthened the experiences of all learners. I hope to see more intertwining of formal and nonformal agricultural education in the future, where our efforts are more about the learning experience and growth of those involved, than the organization name or whether it's in a formal or nonformal setting." -Dr. Debra Barry

"As a former career technical education student, in the business track, the importance of student organizations, internships and community engagement allowed for me to be a well-rounded contributor to our field of work. Being able to combine formal and nonformal education throughout high school gave me the necessary skills to navigate different fields of work and made me a stronger leader. Considering Dewey's philosophy, being able to teach a student beyond just skill-based learning will allow for a more transformative future for agriculture and career technical education." -Patricia Jordan

"As a former high school agriculture teacher and FFA advisor, I witnessed competition between FFA and 4-H. After a few years, I started to personally feel this way as I watched OUR FFA officers competing in their 4-H jacket at various competitions and shows. That being said, I frequently sought out assistance from our local extension agents for my classroom and my CDE teams. Knowing that the competition between the two worlds needs to be eliminated, I look forward to a future where formal and nonformal education experiences are combined to create well-rounded individuals ready to support our agriculture industry." -Heather Nesbitt

"Through middle and high school, I was extremely involved with FFA. Collaboration with 4-H was never a thought that crossed my mind, or an option I thought would be possible. Each organization brings unique resources to the table. As a soon-to-be high school agricultural teacher and FFA advisor, I look forward to the possibility of combining formal and non-formal education to enhance the learning experiences presented to our students." -Natalie Money

References

Barrick, R. (1989). Agricultural education: building upon our roots. Journal of Agricultural Education, 24-29. https://doi.org/10.5032/jae.1989.02024

Cupp, T. H. (1988, December). A Philosophy of Vocational Agriculture. The Agricultural Education Magazine, 61(6), 9-11.

Graham, D. L. (1994). Cooperative extension services. Encyclopedia of Agricultural Science, 1, 415-430.

Hillison, J. (1996). Agricultural education and cooperative extension: The early agreements. Journal of Agricultural Education, 37, 9-14.

Roberts, T.G. & Ball, A.L. (2009). Secondary agricultural science as content and context for teaching. Journal of Agricultural Education, 50(1), 81-91. https://doi.org/10.5032/jae.2009.01081

Smith, K. L. (1991). Philosophy diversions- Which road? Journal of Extension, 29(4). Retrieved from http://www.joe.org/joe/1991winter/f2.php

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Public Issues Education in Agriculture: Opportunities for Engagement and Research

by Nassib Mugwanya

Public issues are widely prevalent in agriculture but remain under studied within the fields of agricultural education and extension. A public issue can be defined as a topic involving widespread impact or concern (Patton & Blaine, 2001). Globally, there are several public issues in agriculture ranging from animal agriculture in the United States (Eise, 2019), to pesticides and herbicide usage in Europe (Kudsk & Mathiassen, 2020), and genetically modified organisms in sub-Saharan Africa and Southeast Asia (Davidson, 2008; Muzhinji & Ntuli, 2021). This pervasive nature of public issues in agriculture imposes a need for education and extension programs to be responsive to the complexities and controversies embedded within public issues (Klerkx, 2020).

Despite the prevalence and continuous prominence of public issues in agriculture, recent scholarly literature on this topic remains scanty in the field of agricultural extension and education. It also remains less known how the controversial nature of public issues has a bearing on how agricultural educators perceive these issues. Consequently, this justifies exploring how controversial public issues impact educator roles in new ways other than the predominantly top-down expert roles in non-controversial topics. The available literature on public issues education (P.I.E.) has been mostly written in the context of the United States, with early scholars focusing on community development programs such as land use conflicts, food safety and welfare reform, and agricultural programs focused on the environmental and social impacts of large-scale livestock operations (Gay et al., 2017; Patton & Blaine, 2001; Singletary et al., 2007).

Currently, most studies on this topic still largely focus on the United States, with limited studies looking at developing countries. Yet, the developing world is currently rife with controversial public issues in agriculture, as evidenced by heated debates on introduction of golden rice in southeast Asia (Hirschi, 2020), genetically engineered crops in Africa (Muzhinji & Ntuli, 2021), and genetically engineered brinjal (eggplant) in Bangladesh (Chakraborty, 2014). How agricultural educators and extension agents have been navigating these controversial public issues in their education and extension programs, remains under-documented in literature. Additionally, the competencies they perceive as important to help the public and farmers in making informed decisions on controversial public issues have not been adequately studied.

Globally, genetically modified organisms, commonly known as GMOs— and most recently bioengineered organisms—remain a highly controversial agricultural public issue (Hirschi, 2020). Whereas the benefits of this technology remain prevalent in literature (NAS Report 2016), the controversies that often surround GMOs continue to overshadow the benefits. Since their introduction in the United States in the mid 1990s, there have been several public concerns associated with the technology, ranging from risks related to both human and animal safety, to environmental, ethical, and socio-economic concerns (PEW Report, 2020). Currently in the United States, GMO controversy still thrives, with new labeling laws and introduction of genetically engineered animals for food being current issues of public concern (Lesko, 2014). In most parts of Europe, GMOs remain a highly controversial public issue, with strict policy regulations on their cultivation in most member states (Kudsk & Mathiassen, 2020). In southeast Asia, the public controversy on GMOs has been thriving for over a decade, as evidenced by destruction of GMO field trials in Thailand (Davidson, 2008), delayed deregulation and commercialization of golden rice in the Philippines, opposition to Bt Cotton and Bt Brinjal in India (Herring, 2015), and opposition to Bt Brinjal in Bangladesh (Chakraborty, 2014). In Africa, especially sub-Saharan Africa, the debate, and controversy around GMOs remains intense (Beumer & Swat, 2021). To date, less than 10 African countries have approved commercialization of GMOs. These approvals include pest and disease resistant maize introduction in South Africa, Bt Cotton in Kenya, Cowpea cultivation in Nigeria, Bt Cotton in Burkina Faso and Sudan (Mabaya et al., 2015). The drivers of this controversy have been mostly due to public concerns relating to GMOs such as the threats to food sovereignty, health and safety risks to humans, animals and the environment, and corporate takeover of the food system (Gbashi et al., 2021). Other drivers have been due to influences from outside the continent such as the EU's strong

opposition to GMOs playing a role in African countries needing to protect their access to strategic export markets in Europe.

In Uganda, GMOs have drawn the most public controversy among recent technologies being developed for adoption by smallholder farmers (Kikulwe & Asindu, 2020). There are over five major crops being developed using genetic engineering techniques to address threats to food security such as pests and diseases, declining soil fertility and climate change (Mabaya et al., 2015). Other crops such as Pro-Vitamin A bananas are being developed to address specific consumer and health related preferences. This has led to mixed reactions among some publics and farmers, with some in opposition, and others in favor of the technology (Lukanda, 2020). Those in support of genetically engineered crops claim they have comparative benefits over conventional crops in addressing food security challenges, while those in opposition are concerned about their human, environmental and socio-economic impacts (Mabaya et al., 2015).

Consequently, this controversy prompted several outreach efforts by public sector researchers to educate the public and farmers on the relevance of genetically engineered crops to Uganda's farming context (Tibasaaga & Zawedde, 2018). However, the involvement of agricultural educators and extension agents in addressing this controversy remains undocumented. According to Patton and Blaine (2001), educators and extension agents have a critical role to play in educating both the public and farmers on controversial public issues. However, the important competencies needed are somewhat different from those needed on non-controversial issues (Singletary et al., 2007). This is because the controversy that surrounds controversial technologies, such as GMOs, is sometimes driven by different values and beliefs among publics that expert scientific and factual knowledge cannot address satisfactorily (Smutsko et al., 2002).

While there are different schools of thought on how experts could engage effectively with non-experts on publicly controversial scientific technologies, much of the literature converges around bottom-up or deliberative approaches than top-down knowledge deficit models (Ahteensu, 2012). This can also be seen in the general trend of agricultural extension in recent decades, where the focus is shifting away from technology transfer to more participatory, deliberative, and system-oriented approaches (Cook et al., 2021). However, despite this growing trend, there is limited literature on how educators and extension agents are evolving with these trends, the nature of education programming reorientation needed, and the adaptive competencies and attitudes important for leading successful extension and education programs on controversial public issues in agriculture.

The public issues education framework provides a context through which educators and extension agents can be assessed on conducting educational programs on controversial technologies such as GMOs. (Gay et al., 2017). This framework was developed by a national taskforce of extension professionals in the United States, and they identified a set of core competencies that extension agents need to conduct effective educational programs on complex public issues. These core competencies are under eight broad constructs:

1. Collect and interpret information about issues, audiences, and educational settings.
2. Design, conduct, and evaluate the impacts of P.I.E. programs.
3. Communicate effectively.
4. Facilitate group discussions and decision-making.
5. Manage and transform conflict.
6. Work with scientific and technical information.
7. Create an environment of professionalism.
8. Creating partnerships

Although the P.I.E framework provides several core competencies for assessing educators and extension agents on conducting education programs on controversial issues, its application to studying genetically modified crops as a controversial issue in agriculture is not documented. This is the gap that my doctoral research sought to address. The study adopted the P.I.E framework to assess the competencies that are important for extension agents to conduct public issues education programs on genetically engineered crops in Uganda. In the findings, communicating effectively was perceived as the most important competency among 58 extension agents that participated in a web-based survey. As a recommendation, there is a need for more educators and researchers to explore how the public issues education competency framework applies to other controversial public issues in different contexts.

References

Ahteensu, M. (2012). Assumptions of the Deficit Model Type of Thinking: Ignorance, Attitudes, and Science Communication in the Debate on Genetic Engineering in Agriculture. Agric Environ Ethics 25:295-313 DOI 10.1007/s10806-011-9311-9

Lukanda, I. N. (2020). 'Activists as strategic science communicators on the adoption of GMOs in Uganda'. JCOM 19 (06), C06. https://doi.org/10.22323/2.19060306.

Beumer, K., Swart, J.A.A. (2021). Who is the African Farmer? The Importance of Actor Representations in the Debate About Biotechnology Crops in Africa. J Agric Environ Ethics 34, 1 https://doi.org/10.1007/s10806-021-09841-8

Chakraborty, T. (2014). Release of Bt-Brinjal in Bangladesh: A Threat to the Region. Economic and Political Weekly, 49(6), 24–26. http://www.jstor.org/stable/24479255

Cook, B. R., Satizábal, P., & Curnow, J. (2021). Humanising agricultural Extension: A review, World Development, https://doi.org/10.1016/j.worlddev.2020.105337

Davidson, S.N. (2008). Forbidden Fruit: Transgenic Papaya in Thailand, Plant Physiology, 147(2), 487–493, https://doi.org/10.1104/pp.108.116913

Eise, J. (2019). Values and perception: Communicating controversial issues in animal agriculture. Journal of Animal Science, 97, 69-70.

Gay, K. D., Owens, C. T., Lamm, A. J., & Rumble, J. N. (2017). Assessing Public Issues Knowledge and Needs of Extension Agents in Florida. Journal of Extension, 55(1), Article 24. https://tigerprints.clemson.edu/joe/vol55/iss1/24

Gbashi, S., Adebo, O., Adebiyi, J.A., Targuma, S., Tebele, S., Areo, O.M., Olopade, B., Odukoya,

Herring, R.J. (2015). State science, risk, and agricultural biotechnology: Bt cotton to Bt Brinjal in India, The Journal of Peasant Studies, 42:1, 159-186

Hirschi, K.D. (2020). Genetically Modified Plants: Nutritious, Sustainable, yet Underrated, The Journal of Nutrition, Vol 150(10) 2628–2634, https://doi.org/10.1093/jn/nxaa220

Kikulwe, M., & Asindu, M. (2020). A contingent valuation analysis for assessing the market for genetically modified planting materials among banana producing households in Uganda, GM Crops & Food, 11:2, 113-124.

Klerkx, L. (2020). Advisory services and transformation, plurality and disruption of agriculture and food systems: towards a new research agenda for agricultural education and Extension studies, The Journal of Agricultural Education and Extension, 26:2, 131-140

Kudsk, P., & Mathiassen, S. (2020). Pesticide regulation in the European Union and the glyphosate controversy. Weed Science, 68(3), 214-222. doi:10.1017/wsc.2019.59

Lesko, B. (2014). Genetically Modified Salmon in the United States: Does the Current Regulatory Paradigm Address all the Issues? https://doi.org/10.17615/a8sd-fr74

Lukanda, I. N. (2020). 'Activists as strategic science communicators on the adoption of GMOs in Uganda'. JCOM 19 (06), C06. https://doi.org/10.22323/2.19060306.

Mabaya, E., Fulton, J., Simiyu-Wafukho, S., & Nang'ayo, F. (2015). Factors influencing adoption of genetically modified crops in Africa, Development Southern Africa, 32:5, 577-591, DOI: 0.1080/0376835X.2015.1044078

Muzhinji, N., & Victor Ntuli, V. (2021). Genetically modified organisms and food security in Southern Africa: conundrum and discourse, GM Crops & Food, 12:1, 25-35.

Patton, D. B., & Blaine, T. W. (2001). Public issues education: Exploring Extension's role. Journal of Extension [On-line], 39(4) Available at: http://www.joe.org/joe/2001august/a2.html

PEW Report. (2020). About half of U.S. adults are wary of health effects of genetically modified foods, but many also see advantages. https://pewrsr.ch/2w5UmGU

Singletary, L., Smith, M., Hill, G., Daniels, S., Smutko, S., Ayres, J., & Haaland, K. (2007). Strengthening Extension's capacity to conduct public issues education programs: Results of a national needs assessment. Journal of Extension, 45(3), Article 3FEA1. Retrieved from http://www.joe.org/joe/2007june/a1.php

Smutko, S., Ayres, J., Babbitt, K., Corcoran, P., Culik, M., Dorsey, M., Frey, L. Haaland, K., Peters, S., Singletary, L. (2002). Public Issues Education: Increasing Competence, Enabling Communities, National Public Policy Education Committee. Public Issues Education Competencies Task Force. Accessed 04/16/21 at https://www.farmfoundation.org/wp-content/uploads/attachments/30 PIEIncreasingcompetencebook.pdf

Tibasaaga, A., Zawedde, B.M. (2018). Science Communication Models for Agricultural Transformation in Uganda. Uganda Journal of Agricultural Sciences 18(2): 123-131.

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Engaging Secondary Students in Experiential Learning Opportunities using Hands-On Aquaculture Instruction

by Dr. Kenneth R. Thompson

Introduction

There is a need for secondary schools to provide authentic learning experiences in science, technology, engineering, and mathematics (STEM). Lee and Songer (2003) calls for using "authentic tasks" when structuring science curriculum. Fusco (2001) calls for making science curriculum "relevant" to enhance science engagement. Other researchers have touted the benefits of promoting community connections and building from local contexts (Bouillion & Gomez, 2001; Hammond, 2001). These are common features in today's science education reform initiatives (Rivet & Krajcik, 2008). The authors contend that such efforts to "contextualize instruction" attempt to leverage students' prior knowledge and experiences to foster understanding of challenging science concepts.

Providing secondary students more authentic, relevant, and community-connected, project-based investigations they can engage with may capture their interests in STEM subjects and careers. Basu and Barton (2007) reported that many urban, low-income students describe science as a discipline that generates sentiments such as boredom, anxiety, confusion, and frustration. The authors claim that students do not like science because it is not connected to their personal experiences and interests. They suggested that while many students do, in fact, develop sustained interest in science, that interest is not always cultivated in traditional venues like school science.

Hammond (2001) suggested science needs to become more inclusive and meaningful for students in a way that parallels natural significance in particular communities while complementing standard-based curricula. She reported students who entered her science methods class have a belief that science is just facts and computations (p. 984). Science education researchers have argued that a "disconnect" between school and home/community life may result in students' feeling that science is impractical, alien, and in contradiction with the beliefs and practices of their lives (Boullion & Gomez, 2001).

Gonzalez and Moll (2002) explored a particular avenue of research coined "funds of knowledge" whereby connection between students' real-world and relevant life experiences, cultural knowledge of a community, and personal goals they are passionate about outside of school are strategically linked with academic instruction and student-centered, project-based activities in the classroom. Basu and Barton (2007) explained that funds of knowledge incorporation into academic instruction is grounded on strategic knowledge and activities for achieving the goals a student has for his/her out-of-school life (p. 468). Earlier studies on the role of "funds of knowledge" in science teaching and learning has been documented when situated in science education (Bouillion & Gomez, 2001; Hammond, 2001; Seiler, 2001). Their findings revealed that utilizing students' "funds of knowledge" could enhance science engagement and learning in multiple ways. Youth should use what they learn in school to shape the communities and world in which they live (Bouillion & Gomez, 2001). The authors indicated that when students found education to be empowering and transformative, they were likely to embrace and further investigate what they were learning, instead of being resistant participants.

Engaging Students in Authentic, Hands-On Aquaculture STEM Learning Experiences in the Classroom

Situated in a contextualized, project-based investigation (PBI) 10-week curriculum unit, students were engaged in investigation that encompassed real-world scientific inquiry pertaining to the field of aquaculture. Contextualized PBI often takes the form of real-world examples or problems, and the tasks students do in the classroom are relevant and meaningful to their lives and to the local and scientific community (Rivet & Krajcik, 2008). The authors explained that a contextualized student learning environment facilitates more links to connect information to students' prior experiences and knowledge while anchoring ideas to everyday contexts.

Incorporating real-world aquaculture activities in the science classroom may be a unique approach for teachers to enhance science engagement and capture students' interest

in STEM disciplines and/or career pathways. Applying funds of knowledge strategies and contextualized PBI in a science classroom when integrating aquaculture may foster students' appreciation for STEM and may even promote long-term desires to make it into a career. Overall, it may promote a more successful STEM learning experience and, most importantly, students gain a foundational understanding of the target concepts during the inquiry process.

The project actively engaged students in practical, hands-on authentic tasks that focused on real-world problems they investigated in the classroom. These were unique experiential learning environments that got students in touch with basic STEM concepts and skills as they connected with aquaculture and aquaponics, which is a sustainable method of growing plants and fish together in a closed recirculating loop system. These super-efficient systems provided students opportunities to develop their critical thinking and problem solving skills as they created and managed an ecosystem while studying the interactions of fish, plants, and bacteria (Figures 1 and 2). Students participating in the project were engaged in various hands-on activities integrating aquaculture and hydroponics (i.e., aquaponics) in the classroom while studying a "living" ecosystem. Likewise, students working in small groups were assigned a real-world STEM job that made connections to their daily lives and community with weekly rotations. Participants were engaged in agriculture STEM in the classroom while learning the ideas of hydroponics and aquaculture, which is sustainable food production. Students took ownership of their learning while investigating, exploring, analyzing, interpreting, and reflecting amongst their peers the tasks, which may foster positive learning outcomes.

Significance of the Project

This project enriched the student experience by offering practical, hands-on experiences in and outside the classroom. Students participating in the project made usable connections to real world applications. For example, while investigating the phenomenon under study, students gained STEM knowledge and skills in the classroom. A goal of the project was to spark "enthusiasm" and "excitement" among the participants and thereby increase their interests in STEM in general, and aquaculture and aquaponics in particular. Further, they might enter the STEM circuit workforce after graduation and/or pursue a STEM-related major in college.

The long-term goals of the project include: students' authentic experiential learning experiences will promote recall and apply important aspects of the project years later; students have enduring understandings of how aquaculture can enrich the quality of life within their own communities; students understand their collective actions and what they do in the classroom is meaningful and they are potentially addressing issues of public concern (e.g., civic engagement);

Figures 1 (TOP) and 2 (BOTTOM). Photos of mini-aquaponics systems used in the classroom for small-scale investigations in the classroom.

students see the "big picture" and share their knowledge and skills with others. Consequently, practical knowledge and skills about aquaculture and aquaponics, and STEM aspects in general, are disseminated from higher education to partnering K-12 schools, teachers, students, families, friends, and then to the community.

Acknowledgements

Thank you Bailey Vandiver for editing the manuscript. This work was supported by the USDA National Institute of Food and Agriculture 1890 Capacity Building Program, award #2017-38821-26442. This project was also in partial fulfillment of Kenneth Thompson's dissertation submitted in the College of Education at the University of Kentucky. Director and Dissertation Chair was Dr. Rebecca Krall. The other committee members included Dr. Jennifer Wilhelm, Dr. Kiluba Nkulu, and Dr. Kenneth Jones.

References

Basu, S. J., & Barton, A. C. (2007). Developing a sustained interest in science among urban minority youth. Journal of Research in Science Teaching, 44(3), 466-489. https://doi.org/10.1002/tea.20143

Bouillion, L. M., & Gomez, L. M. (2001). Connecting school and community with science learning: Real world problems and school-community partnerships as contextual scaffolds. Journal of Research in Science Teaching, 38, 878-898. https://doi.org/10.1002/tea.1037

Fusco, D. (2001). Creating relevant science through urban planning and gardening. Journal of Research in Science Teaching, 38, 860-877. https://doi.org/10.1002/tea.1036

Gonzalez, N., & Moll, (2002). Cruzando el Puente: Building bridges to funds of knowledge. Educational Policy, 16, 623-641. https://doi.org/10.1177/0895904802016004009

Hammond, L., (2001). Notes from California: An anthropological approach to urban science education for language minority families. Journal of Research in Science Teaching, 38(9), 983-999. https://doi.org/10.1002/tea.1043

Lee, H. S., & Songer, N. B. (2003). Making authentic science assessable to students. International Journal of Science Education, 25, 923-948.

Rivet, A. E., & Krajcik, J. S. (2008). Contextualizing instruction: leveraging students' prior knowledge and experiences to foster understanding of middle school science. Journal of Research in Science Education, 45 (1), 79-100. https://doi.org/10.1002/tea.20203

Seiler, G. (2001). Reversing the "standard" direction: Science emerging from the lives of African-American students. Journal of Research in Science Teaching, 38, 1000-1014. https://doi.org/10.1002/tea.1044

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A special thank you to Dr. Courtney Gibson, Associate Professor of Agricultural Communications at Texas Tech University, for doing the layout and design for Volume 94.

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