Strengthening Scientific and Professional Competence Through Deconstructing Sustainable Development Goals for Addressing Global Agricultural Issues.

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Need for Innovation

Agricultural scholars and policymakers strongly advocate that higher education (HE) is crucial to achieving the Sustainable Development Goals (SDGs) (Hallinger & Chatpinyakoop, 2019). However, the literature suggests that existing initiatives around higher education for sustainable development (HEfSD) are inadequate. It requires significant improvement in policy, curriculum, and practice to align with strengthening scientific and professional competence (Franco et al., 2019; Leal et al., 2019). Implementing HEfSD that addresses complex challenges of the 21st century can provide relevant skills to solve issues such as global hunger, obesity, food safety, and climate change (Roberts et al., 2016). Strong and Baker (2020) found that most undergraduate agricultural students do not feel successful in leading when controversial issues intersect.

Additionally, faculty need the training to educate students on today's global challenges. It is critical for educational outcomes to develop new business models, invest in communities, innovate, and collaborate (Weybrecht, 2017). However, a knowledge gap exists among agricultural educators about skills, capacities, and competencies that can effectively address complex problems (Roberts et al., 2016). Our innovative idea uses a systems approach to bridge the gap between the existing curriculum and global efforts to strengthen the capacity to address global agricultural issues (GAI).

How it Works

Using a well-designed curriculum tailored to the SDGs framework, we developed layers of awareness in GAI. Our model started with teacher capacity strengthening using the *train the trainer* approach. Our educators were immersed in select SDG academy open online courses. They explored global experts' perspectives on agriculture, nutrition, partnerships, policies, and sustainability. Agricultural educators were guided through the processes, procedures, and programs that can solve complex problems by engaging in readings, case studies, and critical thinking. On completion of assigned modules, a content analysis was conducted by the educators to identify priority GAI. A new curriculum was developed by integrating pedagogical and andragogical concepts using tools to aid effective experiential learning (Elliot et al., 2022).

The participants were students who signed up for the GAI course at the [University]. There were 40 participants. The content was delivered weekly, over 25 sessions within 75 minutes per session. An activity-based environment that blended face-to-face, digital, simulative, and cognitive engagement tools in groups and individually was created. Students' participation was done synchronously and asynchronously. Students were tasked with identifying and solving specific complex GAI in a final project. An individualized multimedia 9 minutes presentation addressing specific indicators within the SDGs was presented. Each participant provided personalized feedback and completed a survey adapted from an already existing valid and reliable instrument to assess their scientific and professional competence over the learning period. The results to date reflect the input from the feedback and survey responses.

Results to date

The training administered to the agricultural educators strengthened their capacity and equipped them with scientific and professional competency that addresses complex problems. A

robust curriculum ensued as a product for HEfSD in the [University]. Fifty percent of the educators reported having a better understanding of how to tackle *wicked problems* in diverse agricultural settings. Students described the high-impact learning experiences they had working in teams to brainstorm and solve complex problems and scenarios. Furthermore, students learned to creatively personalize actions to advance and implement the SDGs across interdisciplinary issues that the world is facing today. Results to date showed learners improved in knowledge and confidence in discussing GAI. Ninety percent of the final projects presented were across emerging challenges on the nexus of food, agriculture, and health in GAI. Learners collaborated and strategized on innovations to tackle these challenges, and identified partnerships with agencies that can work and sources of funding to implement solutions. Importantly, this strengthened scientific and professional competence through robust interaction among participants in a formal and nonformal environment.

Advice to others

Agricultural education is increasingly crucial as it equips the scholarly community with a range of food, agriculture, and natural resources skills, capacities, and competencies to effectively address complex problems (Roberts et al., 2016). Other technical fields strongly advise their graduates and professionals to develop global competencies in line with their market trajectories (Oritz et al., 2020). HEfSD is important to quality education and lifelong learning (Rieckmann, 2018). It empowers educators and learners with the cross-cutting competencies needed to understand the SDGs. They demonstrate awareness of wicked problems, increased knowledge of GAI, and a positive attitude to proffering associated solutions. This innovative idea promotes real-life scenarios to be explored with guest speakers and industry experts in a transdisciplinary context. Educators, students, graduates, and social scientists through this participation can demonstrate increased confidence and skills suitable to thrive in the food, agriculture, and natural resources workforce which supports the American Association for Agricultural Education (AAAE) research priority three and seven agendas. In addition, this innovative idea is important to be shared to increase reach and receive feedback for refinement. The AAAE is a global community of practice and a suitable platform for multidisciplinary engagement of actors to share, learn and enhance scientific and professional competence.

Resources Needed

Coordinating and leveraging the multiple resources within our already existing platforms was instrumental to the success of our approach. The resources used included the expertise of the faculty who was the principal instructor. Having a lead expert is an essential component in the problem, process, and solutions model. It was an indirect cost as it did not attract monetary commitments. However, direct costs were incurred from the course fee for the training the trainer curriculum. This cost was charged at $50 per course for the co-instructors to receive quality content from massive open online courses before delivery. Engaging experts from public and private sectors to provide lived experiences for contextual learning required no financial costs as these were done virtually. The use of digital tools such as Zoom, Mentimeter, Jamboard, and Kahoot enabled collaboration and participation among learners at no additional costs. This innovative idea is affordable and can be replicated among agricultural educators to use HEfSD to strengthen the scientific and professional capacity of scholars to address GAI.

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