Developing Online Pedagogical Content Knowledge Learning Opportunities for Elementary Agriculture Teachers

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Introduction

Agricultural education teachers are traditionally certified to teach at the middle and high school levels (National Association of Agricultural Educators, 2022). Georgia, among other states, recently sought to formalize teaching agriculture at the elementary level because of the touted benefits for young children (Georgia Senate Bill 330, 2018). For example, a growing concern is a lack of agricultural literacy among today's youth, a problem because agriculture and its related production influence numerous areas of life (Hess & Trexler, 2011; Koy & Tarpley, 2020). Though acknowledged as important, no corresponding certification for elementary agriculture education (EAE) teachers exists as it does for secondary agriculture teachers. Currently, in Georgia, some elementary agriculture teachers are certified in elementary education, while others are certified in agriculture education. Previous research by Peake et al. (2020) aimed to develop standards for elementary agriculture education, but no corresponding research exists on how to train elementary or agriculture teachers in these standards. Addressing this knowledge gap is one goal of *Professional Development for Agricultural Literacy in Elementary Agriculture Teachers* (Peake, 2021-2024), a NIFA/USDA grant supporting training for elementary agriculture education at large. A specific objective of the grant is to "develop EAE teachers to apply Pedagogical Content Knowledge (PCK) within teaching Food and Agricultural Sciences," where PCK is the result of knowing *how* to teach (pedagogy) the *what* to teach (content) (Shulman, 1986). The following innovative idea is an explanation of "Ag Ed 101," an online Google classroom designed to prepare elementary agriculture teachers with appropriate PCK. This project aligned with the American Association for Agricultural Education's National Research Agenda Research Priority 5, "Efficient and Effective Agricultural Education Programs" (Roberts, Harder, & Brashears, 2016).

How it Works

The "Ag Ed 101" Google Classroom is an easy-to-use training site for those interested in teaching agriculture at the elementary level. There are six learning modules total, which include: 1) Ag Ed for Georgia's Future; 2A) Cross Curriculum and Ag, 2B) EAE Curriculum Standards; 3) Put the "A" (Ag) in S.T.E.M.; 4) Hands-on Learning; 5) External Resources; and 6A) Community Partnerships and 6B) Local Steering Committees and Advisory Boards. Introductory and concluding modules also accompany the learning modules and provide teachers with an overview of the course and relevant contact information. Within each learning module, teachers will find one to four videos featuring a professional or expert from a different organization across the state (e.g., Georgia Farm Bureau, University of Georgia, University of Georgia Extension, Georgia Department of Education, etc.). Some videos have an accompanying task, assignment, or short quiz. For example, Module 2B guides teachers through the website of Georgia's elementary agriculture education standards. The corresponding assignment asks teachers to complete a lesson plan based on one or multiple of these standards.

Results to date

Thirty-three teachers enrolled in the pilot round of the Ag Ed 101 Google Classroom. Of the 33 teachers, five applied for and received mini-grants. Several in-person events followed the pilot round, including an all-day field trip focused on learning about how to implement agriculture in an elementary classroom (20+ attendees) and two focus groups dedicated to learning about elementary agriculture educators' school gardens (6 and 11, respectively).

Future Plans

The Ag Ed 101 Google Classroom first operated as a pilot program and is one of the first attempts to provide EAE teachers with PCK. The next step is to conduct a program evaluation. Stufflebeam (1971) suggested that the Context, Input, Process, and Product (CIPP) evaluation model can guide improvement and decision-making in the education setting. The goal of the entire evaluation is to answer, "What should we do? How should we do it? Are we doing it correctly? and Did it work?" (p. 5). Each component also consists of three steps: determining, attaining, and sharing of pertinent information. The following briefly outlines how CIPP will be used to evaluate Ag Ed 101. The context evaluation will examine the precursory idea for the project versus where it stands now (Stufflebeam, 1971). For example, the initial idea was conceived as a training course that elementary or agriculture teachers could participate in to learn more about either designation. Given the COVID-19 pandemic, the classroom was conceptualized in an online format. If the program is to continue in this format, program developers should ask what its current unmet needs, potential opportunities, and main problems are. The input evaluation will focus on gathering information pertaining to personnel, resources, and procedures, and examining research about any similar programs (Stufflebeam, 1971). Regarding gathering information, personnel, for example, would include program administrators and video presenters, many of whom are no longer in these same positions. A relevant question becomes, should the videos be redone to more effectively highlight the presenters' roles in supporting elementary agriculture education? Process evaluations seek to examine how well the program functions, where the overarching questions ask how well the plan is being implemented and if there are barriers to this process (Stufflebeam, 1971). Data in the form of reaction forms or surveys, pre and post-questionnaires, among other methods, can be used to guide future revisions. The product evaluation seeks to determine how well the program met its goals (Stufflebeam, 1971). Clear criteria and objectives should be set for the success of the program so that administrators can decipher if the program accomplished its intentions.

In sum, using questions listed in Stufflebeam's (1971) CIPP evaluation will guide the future directions of the program and the development of new PCK materials and modules for elementary agriculture teachers. Another important consideration for the program's longevity is participant recruitment. Although the Ag Ed 101 Google Classroom is an online platform, a further future goal of the CIPP evaluation is to determine how the material could be used in-person or otherwise by those in other states also looking to train elementary agriculture teachers.

Costs

There is no anticipated cost associated with this project as university faculty intend to conduct the evaluation as part of their regular duties. However, individuals considering taking on this project should consider whether they have the support of their state's agriculture specialists and if they would have time to continually review and refresh such a website.

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