Navigating the Digital Field: Teacher and Student Teacher Experiences of Artificial Intelligence in Agricultural Education

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Introduction

Artificial Intelligence (AI) is evolving at a rapid pace, providing unprecedented access to vast amounts of data (Javaid et al., 2022). In educational contexts, the ethical implications of AI have become increasingly significant, particularly with respect to issues of plagiarism, transparency, accountability and authorship (Editorials, 2023; Hosseini et al., 2023). AI's ability to generate novel ideas by combining concepts and exploring creative domains further heightens concerns about its potential effects on student work. The use of AI in education has moved beyond foundational functions, signifying a shift toward more sophisticated and wide-ranging applications (Chen et al., 2020). As AI continues to integrate into educational settings, understanding teachers' perceptions of these technologies becomes crucial. This study aimed to investigate agricultural science teachers' and student teachers' experiences with advancing AI tools and to examine how AI influences the three-circle model of agricultural education: classroom, FFA, and Supervised Agricultural Experience (SAEs). The central research question guided this study was: What are agricultural science teachers' and student teachers' experiences of the use of artificial intelligence?

Theoretical Framework

The theoretical framework this study utilizes is the diffusion of innovations theory by Rogers (2003). This theory has been widely used in agricultural education and extension education to explain the decision to utilize new practices and ideas, as well as educational experiences (Thiel & Marx, 2021). Interview questions were guided by this theory to explore agricultural science teachers' and student teachers' experiences with AI adoption within the three-circle model of agricultural education. According to Rogers (2003), individuals move through an innovation-decision process when determining whether to implement a new concept, influenced by the innovation's relative advantage, compatibility, complexity, trialability, and observability. For educators and student teachers to incorporate AI effectively, they must recognize a need, identify clear benefits, possess the capability to integrate the innovation, experiment with various approaches, and observe evidence of successful outcomes in similar contexts (Thiel & Marx, 2021).

Methods

A phenomenological approach was used to capture the experiences of agricultural science teachers and student teachers as they integrate AI into the three-circle model (Creswell & Creswell, 2017). Researchers sought to collect data from specific groups of teachers including student teachers, early career teachers (1-5 years), mid-career teachers (6-19 years), and late career teachers (20 or more years) (Sorensen & McKim, 2014). A total of eight participants were purposively selected (Ary et al., 2002), three student teachers and five in-service teachers. A semi-structured interview protocol allowed for focused yet flexible conversations, enabling participants to share their experiences, perceptions, and concerns regarding AI in agricultural education (Kallio et al., 2016). Data were transcribed verbatim and subjected to thematic analysis using open coding to identify, categorize, and refine emerging concepts. To maintain consistency in the coding process, intercoder reliability measures were implemented.

Results/Findings

There were three overarching themes which emerged from the data. The first theme was *AI as a pedagogical tool.* Participants viewed AI platforms such as ChatGPT, Brisk, Magic School AI, and BreezyTA as resources for brainstorming, generating lesson ideas, and creating step-by-step instructions and rubrics for the classroom. The student teachers and early career teachers valued AI's ability to help with script writing, lesson planning, and providing guidance for contests they may be unfamiliar with in Leadership Development Events (LDEs) and Career Development Events (CDEs). Several participants mentioned that AI gives them a different perspective. Participant three stated AI "gives you something different that you may have never thought about." All participants highlighted the importance of teaching students how to use AI responsibly, positioning it as an aid rather than a shortcut for completing their work or creating manuscripts for FFA and SAE competitions. The second emerging theme was *ethical considerations and student learning.* Participants mentioned that they had concerns about plagiarism and the originality of AI- generated content. Majority of participants noted that AI outputs can be incorrect and lack sufficient knowledge in agriculture and other aspects of the three-circle model, potentially misleading them and their students. All participants expressed they were worried about students not fully grasping or retaining information when they rely heavily on AI. Academic dishonesty was another point participants emphasized within this theme, noting it depends on how students and teachers use AI shifts their thoughts if AI is viewed as a tool or academic dishonesty. The final emerging theme was *creativity and authenticity in instruction*. Several of the participants noted that AI-generated content takes away from the personal touch and creates barriers on student's creativity. Participants also showed concerns about students relying on AI as it produces similar or uniform content, limiting the process of innovative thinking. Participant four stated "AI is never going away and is continuing to grow, so adapting to it now can help in the long run." All participants highlighted the need for professional development to help them understand and integrate AI effectively.

Conclusions/ Implications/Recommendations/Impact

The findings reveal that while participants recognize that AI has potential to streamline lesson planning, generate new perspectives, and assist with various instructional and intracurricular activities (FFA/SAEs), there were still many concerns about academic integrity, reliability of content, and potential loss of creativity. These insights align with the ethical considerations and emerging questions about AI's influence on student work previously discussed (Editorials, 2023; Hosseini et al., 2023). Consistent with the diffusion of innovations theory (Rogers, 2003), participants weighed AI's relative advantages (idea generation, efficiency) against its complexities and potential drawbacks (ethics, accuracy, misalignment with agriculture and FFA knowledge). An implication for practice such as providing professional development for teacher preparation programs and in-service teachers to address effective AI integration. Future research should include a quantitative study to expand generalizability and explore variations in AI use between novice and experienced teachers. Other research could explore if teachers match the ethical standards they are expecting from their students.

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