Artificial Intelligence and Disciplinary Literacy

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Introduction

Disciplinary literacy, the ability to read, write, and communicate using the specialized language of a field (Shanahan & Shanahan, 2012), is a foundational component of school-based agricultural education (SBAE) (Meishen & Trexler, 2003). Historical research confirms that developing student literacy remains a persistent challenge (Kovar & Ball, 2013; McKenna & Robinson, 2002). SBAE teachers often report frustration that literacy mandates deemphasize the sustained, individual writing exercises necessary for developing robust writing skills. This frustration reinforces their perceptions of literacy as a supplemental task. This perception exacerbates the gap between students who possess agricultural knowledge (literacy) and those who communicate effectively (being literate). Generative Artificial Intelligence (AI) presents a promising approach to addressing these longstanding instructional challenges. AI as an instructional partner has the potential to enable teachers to integrate sustained writing practices that are often overlooked efficiently. The effect of integrating generative AI or large language models (LLMs) is reducing the implementation barrier for these perceived supplemental tasks. The successful integration of AI is contingent on SBAE teacher adoption. This study sought to understand the initial barriers to adoption among interested SBAE teachers through two research objectives: (1) Identify the specific perceptions, barriers, and supports regarding AI adoption for agricultural literacy within SBAE teachers interested in AI technology; and (2) Describe the nature of SBAE participant perceptions in the context of established technology adoption models.

Theoretical Framework

This study was framed within two established models that address the diffusion of technology within a social system. Rogers' (2003) diffusion of innovations (DI) and the technology acceptance model (TAM) (Davis, 1989). This dual-lens framework, utilizing DI's macro-level perspective, evaluates the dissemination of technology through agricultural education systems, encompassing communication channels and the categorization of adopters. TAM's micro-level perspective is then used to frame the psychological factors influencing an individual's acceptance or rejection within the social context. TAM posits that two personal beliefs, perceived usefulness and perceived ease of use, are the primary drivers of adoption.

Methods

This abstract presents the initial descriptive analysis of a dataset collected in August 2025. This data is preliminary to a larger, forthcoming study. The data were collected from a purposive sample ($N = 75$) of SBAE teachers voluntarily attending the AI literacy workshop at the Alabama Association of Agricultural Educators, with 72 participants completing the questionnaire (96%). Data were collected using an established and pilot-tested (spring 2025) instrument from an accepted study (Lindner et al., 2026). This instrument was modified to measure perceptions of AI literacy and validated by an expert panel for content validity and alignment with the dual-lens theoretical framework. A 5-point Likert-type interval measurement scale (5 = *Strongly Agree*, 4 = *Agree*, 3 = *Neither Agree nor Disagree*, 2 = *Disagree*, and 1 = *Strongly Disagree*) (Lindner &

Lindner, 2024) was used to measure the six theoretical constructs. Data collection also included the participants' personal and professional characteristics. The instrument demonstrated strong overall consistency (α = .88*),* supported by the reliability of the individual constructs: *Perceived Usefulness* (α = .93); *Perceived Ease of Use* (α = .86); *Perceived Barriers* (α = .83); *Organizational Support* (α = .74); *Observed Outcomes* (α = .73); and *Behavioral Intention* (α = .90). A seventh section collected personal characteristics and a single-item measure of comfort with adopting technology. The data were analyzed using descriptive statistics.

Results/Findings

The participants (N = 72) were predominantly male (64.8%, n = 46) and taught in rural settings (71.8%, n = 51). The majority held a Master's degree (52.80%, n = 38) or a Bachelor's degree (34.70%, n = 25). The mean age of the participants was 40.32 years (SD = 11.84, N = 69), and the reported mean teaching experience was 11.31 years (SD = 9.20, N = 72). A key finding was that although participants reported a high level of comfort with integrating new technology (M = 4.31, SD = .76), their perceptions of AI were neutral when considering agricultural literacy instruction. Teachers reported agreement with *Perceived Usefulness* (M = 4.26, SD = .69) and *Behavioral Intention* (M = 4.10, SD = .64). Participants were neutral regarding *Perceived Barriers* (M = 3.70, SD = .58), *Perceived Ease of Use* (M = 3.77, SD = .77) and *Organizational Support* (M = 3.72, SD = .58). Scores for *Observed Outcomes* (M = 3.34, SD = .67), were the lowest agreement level.

Conclusions

The findings reveal the nature of the barrier to AI adoption for this early adopter sample. A disconnect between participants' high general technology comfort (M = 4.31) and their neutral, uncertain assessment of AI's practical constructs (e.g., *Perceived Ease of Use*, *Observed Outcomes*) suggests a pedagogical adoption gap exists among innovators. The data reveals close alignment with Rogers' early-stage adoption and is supported by TAM; educators' high *Perceived Usefulness* strongly supports their behavioral intention, belief in AI, and willingness to use the technology. The lowest level of agreement was reported in *Observed Outcomes*. This suggests that even for early adopters, diffusion is stalled at the Observability stage. The SBAE teachers participating in this study have not seen enough validated examples of success within their peer group to move from high intention to confident implementation. These findings suggest that generic professional development may be ineffective, as the grand challenge is not a general skills deficit but rather a lack of confidence and insufficient evidence of AI's potential. Interventions should target the specific constructs *Observability* (DI) and *Perceived Ease of Use* (TAM). We suggest establishing a peer AI prompt library that provides SBAE teachers with access to validated, agricultural-specific prompts. We also recommend framing AI as a grading partner as an intervention to bypass instructional planning and establish immediate success when removing barriers to student-sustained writing exercises.

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