

Exploring AI-Supported Learning in Agricultural Leadership Education

Introduction, Purpose, and Objectives

Artificial intelligence (AI) tools are gaining traction for use by students and faculty in institutions of higher education. The use of online tools and applications that integrate AI is rapidly increasing in the area of teaching and learning. While these tools and applications can offer benefits to both faculty and instructors, they have also caused disruption in higher education and there is still much to be learned in terms of how these tools can maximize learning for students. One way AI has been leveraged within teaching and learning is through course discussion boards. Discussion boards are a tool and strategy that can increase student-student, student-teacher, and student-content interactions (Bernard et al., 2009). Smith (2009) discussed recommendations for effectively using discussion boards in an asynchronous introduction to leadership course and concluded that a well-designed discussion board fosters critical reflection and student engagement. While discussion boards can help students develop critical thinking skills and apply knowledge by reflecting on course concepts, there are concerns with quality and engagement by students (Du & Xu, 2010; Kim et al., 2007; Peters & Hewitt, 2010). Another drawback with traditional discussion boards is the amount of time that instructors spend grading and moderating the boards, thus often resulting in less quality feedback to students. Discussion boards that utilize AI can maximize instructor time and provide immediate feedback and automated grading. However, perceptions of use of AI-driven discussion boards by those in higher education, and specifically leadership instructors and students is not well-documented.

While research on Packback is not plentiful, there have been a few studies looking at the outcomes of using this platform. Colclasure et al. (2025) examined student perceptions of Packback among six constructs: attractiveness, efficiency, perspicuity, dependability, stimulation, and novelty. Their findings suggest that the pragmatic qualities of efficiency, perspicuity, and dependability were well received by students, but there could be room for improvement in attractiveness and stimulation and novelty. There is evidence that Packback use in an asynchronous classroom discussion improves students' quality and quantity of posts when compared to discussion boards completed through Canvas (Archibald et al., 2023). Another study revealed that students using Packback discussion boards had self-improved learning, were perceived to have put forth more effort, and had improved satisfaction when using the platform (Rutner & Scott, 2022). Packback has published a few white papers on their website with claims that it increases student engagement, increases discussion rigor and quality, improved final grade outcomes, and had positive student and faculty satisfaction (Packback, 2021). Kiesel (2020) cautions that instructors should consider if the student costs of using a subscription-based platform are worth its use.

In agricultural leadership courses, AI is rapidly transforming teaching and has sparked questions about its instructional value and real-world applications, which has influenced teaching and learning practices where critical thinking, communication, and self-reflection are essential for preparing students to lead in food, fiber, and natural resource systems. The use of online

platforms like Packback offers a way for students to engage with their peers while improving their learning (Bernard et al., 2009). This platform allows students to write and respond to discussion questions, receiving detailed feedback that strengthens their skills in writing, communication, and critical thinking. Each post is reviewed using a scoring system that measures curiosity, credibility, communication, and quality of writing (Packback, 2025). This platform also has a deep dive feature, which allows instructors to assign students a longer writing task. Students can receive instant feedback to improve on flow, structure, and credibility before turning in the assignment. Agricultural educators face challenges in developing these competencies, especially with online and large-enrollment courses where individualized feedback is difficult to scale. This study addresses a gap in the agricultural education literature by examining the experiences of students using an AI-driven discussion tool in an undergraduate leadership course. The purpose of this paper is to examine the benefits and challenges of using AI-assisted discussion boards and writing assignments in agricultural leadership courses. Specifically, this study sought to (1) explore the benefits and limitations of using an AI tool in a leadership course, and (2) gain perspectives of students from using the AI tool in a leadership course in regard to their communication skills, engagement with the course, and critical thinking.

Theoretical Framework

This study is framed by Self-Determination Theory (SDT) and the Community of Inquiry (CoI) model. SDT emphasizes the importance of autonomy, competence, and relatedness in fostering motivation, principles reflected in Packback's design, which promotes student-initiated questioning and real-time feedback (Yuerong et al., 2024). The CoI model emphasizes the significance of cognitive, social, and teaching presence in fostering meaningful online learning, offering a valuable framework for examining student engagement in AI-facilitated discussions (CoI, n.d.). Discussion boards can help students develop critical thinking skills and apply these skills to knowledge through reflection. (Du & Xu, 2010; Kim et al., 2007; Peters & Hewitt, 2010) The combination of these two theories showcases the psychological and social meaning of implementing an AI tool like Packback in learning environments. SDT explains how automatic feedback can result in student motivation (Yuerong et al., 2024) .While COI explains how online communities can be captured through cognitive and social factors, which results in more student engagement (Col, n.d.). Packback encourages students to engage in discussion posts, allowing them to develop a cognitive presence through deeper reflections and engaging in critical thinking. Students also use social factors on this platform by engaging with peers and developing dialogue in this learning environment.

Methods

A basic qualitative design was used to examine Packback's outcomes in an undergraduate online asynchronous personal leadership course. A basic qualitative study seeks to understand how people interpret their experiences, construct their worlds, and examine meaning they assign to their experiences (Merriam & Tisdell, 2016). Because the researchers were interested in how undergraduate students perceived the use of Packback in an undergraduate leadership course, a qualitative framework seemed the most effective means to explore the outcomes.

Population and Context

Participants in this study were students enrolled in a personal leadership education course in Spring 2025. Students were in an academic major or minor in leadership. In the course, students completed self-assessments, reflections, and completed readings and discussions through Packback. Both the discussion feature and deep dives were utilized in the course. Students completed 10 Packback discussion posts and 10 Packback deep dives which consisted of journal entries throughout the 14-week semester. ($n = 74$). The instructor also obtained feedback about the use of Packback at three points throughout the semester. There were three questions students answered at each reflection point:

How would you describe your experience using Packback so far in Personal Leadership Education?

What struggles (if any) have you experienced in using Packback in Personal Leadership Education?

What positive outcomes (if any) have you experienced in using Packback in Personal Leadership Education?

The instructor used this feedback to address concerns and assess areas for clarification and understanding throughout the semester. Data for this study consisted of only the final reflection where students reflected about their thoughts on the use of Packback as a summative approach. We specifically wanted to understand how Packback contributed to their learning in the course, how it influenced their critical thinking and communication skills as well as their leadership abilities.

Data Analysis

Content analysis was used to examine student reflections to understand their perceptions of using Packback and how it contributed to their learning in the course, critical thinking, and communications skills. Content analysis has many advantages in leadership research (Insch et al., 1997) and involves the analysis of communications and looking for emerging themes, and exploring common ideas in the communications to understand their significance (Bryman, 2012). Deductive analysis was used with the assistance of Microsoft Copilot (Microsoft Copilot Analysis of Final Reflections, 2025). The analysis focused on identifying recurring themes related to student engagement with course content, writing development, critical thinking, and leadership development.

Trustworthiness was established through credibility, dependability, and confirmability. Credibility was established by having a researcher interpret the coding after Microsoft Copilot initially coded the analysis of the data. Dependability and confirmability were established through the use of an audit trail and peer debriefing. To address transferability or external validity of the study, a description of the findings using rich, thick description was used (Lincoln & Guba, 1987).

Results/Findings

There were 74 undergraduate students ($n = 74$) who consented to using their reflections for this research. Through qualitative content analysis assisted by Microsoft Copilot (Microsoft Copilot Analysis of Final Reflections, 2025), we identified four key themes: writing skills development, critical thinking about leadership, engagement with course content, and leadership development.

Writing Skills Development

There were four key areas under the main theme of writing development that emerged from the findings: improved clarity and structure, increased writing confidence, mixed perceptions of depth, and feedback utility. While Packback helped students to write more clearly and increase their confidence, some students felt the writing was too casual or lacked academic rigor. Packback's tools for writing were seen as both helpful but also superficial. Student 6 noted this in their reflection about writing:

Having to write every week forced me to slow down and actually think through my responses, and it made me more aware of tone and structure. I also got more comfortable with expressing my thoughts in a way that was clear but still sounded like me.

Another student commented that "Packback helped me grow as a writer. It made me think more about how I explain my ideas and how to back them up." (Student 5). And, according to Student 6, "Having to write every week forced me to slow down and actually think through my responses, and it made me more aware of tone and structure. I also got more comfortable with expressing my thoughts in a way that was clear but still sounded like me."

Critical Thinking about Leadership

There are three subthemes under this broad theme including perspective taking, deeper reflection, and skepticism about depth. While some students felt that reading their peers' post helped them consider different viewpoints and think deeper about leadership concepts, some students felt the prompts were not as challenging or that their critical thinking development came from other course components. Student 25 shared "Responding to questions makes me dig deeper...I became more comfortable with exploring the deeper meaning behind leadership practices."

Student 9 noted that "Packback has helped me develop my critical thinking abilities about leadership because seeing others posts about how others think about leadership helps me think outside the box about leadership." And, Student 17 shared "Some questions challenged me to think deeper about what leadership actually means, instead of just repeating textbook definitions."

Engagement with Course Content

There are three subthemes under this broad theme that came out of the data: consistent engagement, peer interaction, and content reinforcement. In their reflections, students described Packback as a tool that enhances their connection to course content that increases their overall engagement, and makes students take accountability for their learning. Student 2 noted:

A lot of times with online classes I get lost in the content or I miss some portion of the content completely. The packbacks kept me up to date and accountable. They also made me go through and reread the parts that I did not understand or that I was not knowledgeable enough to write about. It also helped me to tie all of the points from the modules together and really get a better understanding of the material we were given. This was almost as good as in person lectures.

Student 6 shared that “I felt way more connected to the content because of Packback - especially since it was a space where we could process what we were learning in our own words.” And, Student 38 mentioned that Packback demanded continuous application and not just passive absorption, “the course material seemed more alive. I was able to think about leadership all week long instead of just when tasks were due thanks to the weekly suggestions.”

Leadership Development

Under the broad theme of leadership development, there were three subthemes which were: reflective growth, indirect development, and desire for real-world practice. Student 5 mentioned “It gave me a space to reflect, to see other people’s perspectives, and to think about how I lead.” While Student 7 reflected that:

It[Packback] develops a vigorous learning atmosphere where I could test my knowledge, give and gain feedback, and develop relationships between concepts and practices. It also allowed me to guide discussions through important topics and discussion questions that model thinking for my fellow students and strengthening leadership as a whole and being driven through learning.

And, Student 14 shared:

Through the process of asking questions, offering insights and engaging in leadership discussions, I have gained a better sense of what leadership really means. I also feel that it gave me a better insight into my own leadership style and areas that I want to continue to develop.

Conclusions/Discussions/Implications/Recommendations

This study explored the integration of an AI-driven tool, Packback, in a leadership education course with a goal to understand its impact on student engagement, communication, critical thinking, and leadership development. There were four themes used for analysis including writing development skills, critical thinking and leadership, engagement with course content, and leadership abilities development. In regards to writing development, students reported clearer, more intentional writing through the use of Packback. In the theme of critical thinking, students perceived that Packback prompted deeper analysis and reflection. Engagement was reflected by students who indicated the platform fostered sustained interaction with course content. Finally,

students reported they gained insights into their leadership styles and communication skills through the use of Packback.

Self-determination theory (SDT) and community of inquiry (CoI) theory were used as theoretical frameworks in this study. This study showed alignment with the core principles of SDT and CoI. The structured yet flexible nature of Packback promoted autonomous learning and enhanced students' sense of competence through iterative feedback. Autonomy was present through the open-ended prompts and student-led questioning, the weekly writing and feedback within Packback helped students feel more capable, and the peer interaction fostered a sense of community. including autonomy, competence, and relatedness. Packback also facilitated cognitive, social, and teaching presence to create a dynamic online learning community consistent with the CoI model. Cognitive presence was facilitated through students engaging deeply with leadership concepts and going beyond surface-level understanding. Social presence was indicated through the peer interactions and discussion posts that created a collaborative environment. Finally, teaching presence was evidenced through instructor feedback and platform scaffolding supported learning.

The use of Packback in leadership education shows promise for enhancing writing and critical thinking, especially in hybrid and online learning environments. Students reported that the tool was helpful for reflection and understanding leadership concepts. In agricultural leadership and education, where science, community, and innovation intersect, developing critical thinking and communication skills is essential. Our results suggest AI tools like Packback can support these goals by deepening student engagement and reflection across learning environments.

Leadership educators should consider adopting AI-based discussion tools as a platform to promote inquiry, reflection, and peer learning, especially in settings where personalized feedback is otherwise difficult to scale. However, they must also provide guidance on effective usage, including source citation and question framing. Based on student feedback, recommendations include better Canvas integration, rubric transparency, and alternative assignments for students facing technological or financial barriers. For agricultural education and leadership programs, the integration of AI platforms should align with the field's mission to cultivate critical thinkers and effective communicators who can lead in diverse and evolving agricultural contexts. This study contributes to the dialogue on AI in higher education and offers a roadmap for leadership programs considering similar innovations. The findings of this study are limited to one online course and therefore research should be conducted with more students and courses to get a more accurate view of the value added by utilizing Packback in an undergraduate course. Future research should also continue to explore how tools like Packback can be optimized to balance technological capabilities with human-centered pedagogy.

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