# Integrating AI to Create an Engaging AI Literacy Course

**Hou I (Esther) LAU**
**ORCID:0000-0001-5058-1120**
**Texas Woman's University, United States**

**Jace HARGIS**
**ORCID:0000-0002-9372-2533**
**AI in Higher Ed Research, United States**

**Brooke CARLSON**
**ORCID:0009-0000-8138-5894**
**Colorado Mesa University, United States**

## ABSTRACT

This methodology paper documents the design and development of an AI literacy course for higher education that addresses critical gaps in preparing faculty and students for responsible AI engagement. Grounded in backward design principles (Wiggins & McTighe, 2005) and AI literacy frameworks (Ng et al., 2021), the six-module asynchronous course integrates curated multimedia resources with task-specific Custom GPTs as pedagogical agents to scaffold learning across conceptual, practical, ethical, and societal competencies. This work contributes to scholarship of teaching and learning (SoTL) by operationalizing "transparency by design" requiring learners to document AI use, verify outputs, and critique limitations thereby embedding ethical accountability within coursework. The paper addresses methodological challenges including the black box problem of large language models, platform drift, and tensions between AI assistance and authentic learning. By centering learner agency and struggle as essential to knowledge construction, the methodology deliberately requires human engagement rather than passive consumption. This replicable, open educational resources (OER)-enabled blueprint offers institutions a scalable model for systematic AI literacy preparation across academic, professional, and civic contexts.

**Keywords:** AI Literacy, Generative AI, Instructional Design, Custom GPTs, Authentic Assessment, OER Pedagogy.

## INTRODUCTION

### Problem and Significance

The trajectory of AI has long intersected with education, though its scope and accessibility have varied. Early AI research in the 1950s and 1960s emphasized symbolic logic and problem-solving but was constrained by limited computing power and fragile rule-based systems. The invention of semiconductors, particularly the shift from germanium to silicon, enabled integrated circuits and the rise of Silicon Valley, driving rapid gains in computational efficiency and affordability (Luckin et al., 2016; Holmes et al., 2019). These advances laid the groundwork for educational technologies such as computational modeling, tutoring systems, and adaptive learning platforms.

By the 2000s, increased data availability, cloud computing, and GPUs supported large-scale machine learning, accelerating the development of intelligent tutoring systems, learning analytics, and adaptive testing in education (Zawacki-Richter et al., 2019). The widespread release of generative AI in 2022 marked a new inflection point, enabling real-time interaction with systems capable of producing human-

like language, images, and sound. This shift introduced unprecedented opportunities and challenges for teaching, learning, and scholarly work (U.S. Department of Education, 2023; EDUCAUSE, 2024).

The urgency of fostering AI literacy in higher education stems from the convergence of historical developments and present-day imperatives. Although AI concepts date back to the 1800s through early mechanical and programmable ideas (Babbage, 1873; Lovelace, 1843), progress has been uneven. Early symbolic reasoning efforts in the 1950s and 1960s, such as the Turing Test, were constrained by fragile rule-based systems and limited computational capacity (Turing, 1950), leading to periods of stalled progress known as "AI winters." A turning point emerged in the early 2000s with the exponential growth of digital data, advances in cloud computing, and the rise of graphical processing units, which together enabled scalable machine learning. By the 2020s, these developments culminated in publicly accessible AI systems capable of generating human-like language, images, and sound, most notably with the widespread release of generative AI tools in late 2022.

Despite rapid integration into society, significant gaps in preparedness remain for both students and faculty. Survey suggests that while learners increasingly rely on AI in academic and professional contexts, many lack a structured understanding of its capabilities, limitations, and ethical implications (Long & Magerko, 2020). Faculty, in turn, face pressure to adapt pedagogical strategies, assessment practices, and disciplinary applications without sufficient training in responsible AI integration (Zawacki-Richter et al., 2019). Uneven access to institutional support further contributes to inequities across faculty roles and disciplines. In the absence of shared frameworks, these disparities risk enabling misuse, deepening inequities, and eroding trust in higher education as students engage with opaque technologies under inconsistent guidance. Addressing these challenges requires anchoring AI literacy in engagement and transparency.

Effective integration requires learning environments in which faculty and students critically engage with AI systems, examine their design and biases, and adopt transparent practices that foreground accountability. For higher education, this involves moving beyond ad hoc adoption toward systematic preparation that equips learners to engage responsibly with AI in professional, scholarly, and personal contexts. By situating AI literacy within its historical trajectory and current preparedness gaps, this work highlights the importance of proactive curricular design. Higher education must not only keep pace with technological change but also model critical, ethical, and transparent engagement with AI to prepare students and faculty for both its opportunities and risks.

## Purpose and Research Contribution

The purpose of this study is to present a course design methodology paper that documents and analyzes a replicable approach to designing an AI literacy course and establishing a framework for its subsequent evaluation in higher education. The methodology is grounded in OER-enabled pedagogy, with "open" defined as the permission to retain, reuse, revise, remix, and redistribute materials (Wiley & Hilton, 2018). The course integrates Custom GPTs as tailored AI agents supporting specific instructional and scholarly functions, alongside curated short-form videos and authentic assessments that engage learners in real-world academic and professional applications. In doing so, the paper contributes to the scholarship of teaching and learning (SoTL) and emerging AI literacy frameworks by modeling systematic and transferable design practices.

The contribution of this work is twofold. First, we present a documented methodology that moves beyond ad hoc experimentation with AI tools by offering a structured process that educators and institutions can adopt, adapt, reuse, remix, and redistribute. The course design draws on backward design principles (Wiggins & McTighe, 2005) to align learning outcomes, instructional strategies, and assessments, while integrating engagement strategies grounded in cognitive and metacognitive learning theories. This approach supports students in developing technical competence alongside critical dispositions toward AI use in academic, professional, and civic contexts. Second, the study advances an evaluative framework for AI literacy courses through authentic assessments such as AI-enhanced project design, reflective analyses of AI outputs, and rubric-based evaluation of student-created artifacts. These practices enable systematic examination of learning outcomes. By documenting both design and assessment processes, this work addresses a critical gap in AI pedagogy.

Our research is positioned as both innovative and generative. The foundational course design elements, including the AI Literacy syllabus, custom GPT prototypes, and curated media collections, were

developed by the authors. AI tools, such as OpenAI's GPT-5, were used strategically to support drafting, refinement, and summarization. This reflexive approach models the literacy skills the course seeks to cultivate, specifically the ability to work in partnership with AI to extend human capacities for meaning making, communication, and evaluation. Centering human judgment alongside generative technology allows course materials, including the AI Literacy syllabus, curated media, custom GPTs, and an engineered prompt, to be reused, revised, remixed, and redistributed by faculty and students to create new iterations of the course. This process aligns with OER-enabled pedagogy and foregrounds learning as iterative and effortful. As Ruda (2017) argues, knowledge is often misunderstood as the transfer of information, when meaningful learning instead requires sustained engagement and struggle with the material.

AI-supported instructional design can enhance individualized learning and efficiency while also raising concerns about learner passivity, reduced engagement, and the reliability of AI-generated outputs (Bora & Kölemen, 2025). These concerns underscore the need for pedagogically intentional structures that emphasize critical thinking, self-evaluation, and active human engagement rather than unreflective reliance on automated systems. Without coherent and systematic approaches to AI literacy, students risk entering professional contexts without the evaluative and adaptive capacities required in an AI-integrated workforce (Upton, 2025). The central challenge, therefore, lies not in new technology itself but in the tendency to offload thinking by positioning generative systems as substitutes for human judgment. This concern directly informs our course design, which foregrounds transparency, reflection, and human-in-the-loop engagement as essential components of AI literacy instruction.

A key challenge associated with large language models (LLMs) is their black box design, which raises concerns about reliability and validity (Glessmer & Forsyth, 2025). Even with carefully engineered prompts, generative systems produce variable outputs, introducing inconsistency into instructional and scholarly applications. Within the SoTL community, Felten's (2013) five principles of good practice include inquiry focused on student learning, grounding in context, methodological soundness, partnership with students, and appropriate public dissemination. Although these principles provide a useful evaluative framework, output variability complicates alignment with contextual grounding and methodological rigor (Glessmer & Forsyth, 2025).

Hamilton and McCollum (2024) extend this framework by proposing a sixth principle, the explicit identification of the researcher's lens. We view this tension as both a challenge and an opportunity to re-center human judgment and creativity. Through our methodology, remixing an AI literacy course intentionally involves struggle and sustained engagement with readings, the syllabus, curated instructional videos, custom chatbots, and generative AI tools such as ChatGPT. This engagement foregrounds reflective practice and reinforces the central role of human meaning making and evaluation.

AI literacy has emerged as a multidimensional construct that extends beyond technical fluency to include ethical reasoning, civic responsibility, and critical engagement with AI systems. Long and Magerko (2020) proposed core competencies emphasizing understanding what AI can and cannot do, applying it appropriately, and evaluating its societal implications. Related frameworks further articulate four overlapping dimensions: conceptual knowledge, practical skills, ethical awareness, and societal impact (Ng et al., 2021; Lintner, 2024). Policy syntheses by UNESCO (2021, 2023) and the OECD (2023, 2025) reinforce that AI literacy must prepare learners to navigate AI responsibly across personal and professional contexts, including attention to data privacy, algorithmic bias, transparency, and equity. In higher education, these frameworks offer not only guidance for curricular integration but also direction for faculty development and institutional policy (Almatrafi et al., 2024; Bond et al., 2024).

## Backward-Aligned and Media-Rich by Design

Instructional design principles provide a critical foundation for integrating AI into educational contexts. Wiggins and McTighe's (2005) backward design model emphasizes alignment among learning outcomes, assessments, and instructional strategies, a principle that translates directly to AI-enhanced course design. Following this framework, the course begins with active and measurable outcomes across four AI literacy domains: conceptual, practical, evaluative and critical, and ethical and societal (Ng et al., 2021). These outcomes are operationalized through authentic evidence products, including case analyses, prompt-engineering logs, and transparency statements, which offer richer demonstrations of competency than traditional knowledge checks (Mueller, 2005; Lombardi, 2008).

Foundational AI education scholarship highlights how AI can support personalization and feedback while also cautioning against risks related to equity, data use, and pedagogy (Luckin et al., 2016; Holmes et al., 2019; Ouyang & Jiao, 2021). Empirical research on self-regulated learning further suggests that AI-enabled tutors and analytics can promote metacognition and strategic learning (Azevedo et al., 2022). Cognitive and metacognitive learning theories similarly underscore the importance of structured practice, scaffolding, and reflection when students engage with AI systems. A distinctive design feature of the course is the use of Custom GPTs as pedagogical agents. Role-specific AI tools, such as a Prompting Coach, Ethics Diagnostic, and Feedback Assistant, were embedded to provide iterative and formative support.

Crucially, AI use was paired with explicit disclosure of assistance, modeling academic integrity and transparency (U.S. Department of Education, 2023; Mollick & Mollick, 2023). This approach positions AI not as a hidden aid but as a co-instructor that shapes norms for responsible use. Recent scholarship illustrates this application. Hargis (2024), for example, documented the use of AI to design a college-level environmental science course, demonstrating how generative tools supported the iterative development of learning outcomes, content, and assessments. AI scaffolded course design through draft generation that instructors refined, reflecting a complementary human–AI partnership. These practices align with OER-enabled pedagogy (Wiley & Hilton, 2018) and AI literacy frameworks by foregrounding transparency, critical evaluation, and iterative refinement in instructional design (Hargis, 2024).

A growing body of literature highlights the role of AI in enhancing engagement and enabling authentic assessment. Authentic tasks such as simulations, project-based learning (PBL), and portfolio artifacts align well with AI's capacity to provide immediate feedback, simulate complex environments, and personalize learning pathways (Mueller, 2005; Lombardi, 2008; Herrington et al., 2010). AI-enabled tools can scaffold student engagement by offering adaptive prompts, role-playing scenarios, and formative feedback loops that extend instructor capacity (Mollick & Mollick, 2023; U.S. Department of Education, 2023). For example, our integration of Custom GPTs designed for task-specific purposes such as ethical reasoning diagnostics, feedback on student writing, or prompt engineering coaching demonstrates how AI can be operationalized as an instructional partner. These applications support active learning and iterative practice while encouraging critical evaluation and reflection on AI outputs. This dual focus on use and critique embodies both the engagement and transparency dimensions central to AI literacy frameworks (Crompton et al., 2023; Chu et al., 2022).

## METHODS

As a course-design methodology paper, this study followed Wiggins and McTighe's (2005) backward design framework to guide the systematic development of the AI literacy course. The design process began by identifying desired AI literacy competencies and learning outcomes, followed by determining appropriate evidence of learning through authentic assessments, and then developing and curating instructional activities, multimedia resources, and AI-supported tools aligned with those outcomes.

### Learning Materials

- Curated IBM AI Videos and Custom GPTs
- AI Platforms
    - ChatGPT (OpenAI) - Generative text, brainstorming, https://chat.openai.com
    - Claude (Anthropic) - Text generation, summaries, https://claude.ai
    - Gemini (Google) - General AI searches, https://gemini.google.com/app
    - Perplexity AI - Research assistant with citations, https://www.perplexity.ai
    - Canva AI Tools - Text-to-image, content creation, https://www.canva.com
    - Hugging Face Spaces - Interactive demos, https://huggingface.co/spaces
    - ElevenLabs - Text-to-speech, https://www.elevenlabs.io

The original prompt provided below was developed by one of the authors to use OpenAI ChatGPT 5o to generate an initial outline for this scholarly work. The prompt was constructed to provide the AI with the context, source materials, and organizational parameters necessary for the task. Specifically, it incorporated three components: the author-developed AI Literacy Syllabus Master, the author-developed collection of Custom GPTs for higher education, and the curated collection of AI literacy videos. These materials represented the course content and resources developed prior to the generation of the manuscript outline. The prompt also specified the desired manuscript sections and instructed the

AI to organize, rather than independently generate, the scholarly content.

**Prompt for AI:** "I would like your support in drafting an outline for a SoTL manuscript entitled, Using AI to Create an Engaging AI Literacy Course. I will attach three files, the first being the master AI Literacy Syllabus Master where I created the raw content for the course; the second is a list of Custom GPTs for Higher Ed that I created for the course and the third is a list of short IBM AI Literacy videos that I reviewed and curated for resources in the course. I would like you to review these files and integrate them into the following format. Please do not write the manuscript, but create an extensive outline for each of the following sections: Abstract, Keywords(4-6), Introduction, Literature Review, Methods, Data Analysis- A qualitative analysis was performed using OpenAI ChatGPT 5o and the following prompt: Analyze the following text for keyword extraction, sentiment analysis, topic modeling, text analysis and summarization, comparison, thematic analysis, and clustering for all of the text, Results, Discussion, Limitations of Study (ID variables: identify, minimize, account), Further Work, References (APA ed7)."

## Design Overview

Building out of the GenTech response, we present a six-session, six-module, asynchronous AI Literacy certificate course structured to provide learners with tiered outcomes, authentic assessments, and scaffolded experiences that build durable AI competencies. Tiers provide opportunities for additional levels and certifications. The design integrates curated multimedia resources, notably an IBM video corpus of 80 short, scholarly-oriented videos with task-specific Custom GPTs, that function as teaching assistants for analysis, ethics, feedback, and research writing. This blend positions AI not as a stand-alone topic, but as a thinking partner embedded throughout the curriculum.

**Module 1: What Is AI & Why Does It Matter?**
In the introductory module, learners articulate foundational AI concepts including machine learning, large language models, and neural networks, and explain their significance in contemporary society.

**Module 2: Prompt Engineering & AI Communication.**
In the second module, students design and refine AI prompts using techniques such as role-based, iterative, and chain-of-thought (CoT) prompting to effectively collaborate with AI tools.

**Module 3: AI Ethics & Responsible Use.**
In the third module, learners evaluate the ethical dimensions of AI use, including bias, transparency, privacy, and fairness, using case studies and established ethical frameworks.

**Module 4: Assessment, Creativity & Academic Integrity.**
In the fourth model, students apply AI tools to enhance creativity, feedback, and assessment design while upholding principles of academic integrity and inclusive pedagogy.

**Module 5: Integrating AI into Work & Life.**
In the fifth module, learners develop and implement practical AI-enhanced solutions for educational, professional, or personal tasks, demonstrating strategic and reflective integration.

**Module 6: Privacy, Security & Digital Citizenship.**
In the sixth and final module, students analyze digital rights, data privacy, and cybersecurity risks related to AI use, and propose guidelines for ethical and transparent digital citizenship.

*Table 1.* Program Learning Outcomes (PLOs) mapped to the modules

| PLO | Module | Topic |
|---|---|---|
| AI Fluency & Conceptual Understanding | 1 | What Is AI & Why Does It Matter |
| Effective AI Interaction & Communication | 2 | Prompt Engineering & AI Communication |
| Ethical AI Reasoning & Framework Application | 3 | AI Ethics & Responsible Use |

| | | |
|---|---|---|
| Innovation in Teaching, Learning & Assessment with AI | 4 | Assessment, Creativity & Academic Integrity |
| Strategic and Lifelong AI Integration | 5 | Integrating AI into Work & Life |
| Digital Responsibility & Data Literacy | 6 | Privacy, Security & Digital Citizenship |

Each outcome emphasizes measurable skills and dispositions, advancing from conceptual understanding to applied ethical reasoning and professional integration. Rather than relying on traditional quizzes, our course employs a comprehensive suite of authentic assessments, including:

- Reflection Journals,
- A Prompt Engineering Lab & Use Log,
- An Ethical AI Case Study,
- An AI Tool Exploration Report,
- A capstone Signature Assignment (My AI Action Plan), and
- An AI E-Portfolio Artifact that demonstrates applied AI literacy in disciplinary contexts.

Appendices A and B provide readers more specifics on the course as presented in this iteration.

## Potential Research Questions (RQ)

This project is conceptualized in two stages: course design and course application and evaluation. The present methodology paper represents the first stage and focuses on the systematic design and development of the asynchronous Foundational AI Literacy course. The second stage will involve implementation of the course and empirical evaluation of learner experiences and outcomes. To establish a framework for this subsequent evaluation, the following research questions, data sources, measurement approaches, and analytical procedures are proposed.

RQ1: How does integrating Custom GPTs as pedagogical agents influence learner engagement and perceived relevance in an AI literacy course?

Data addressing RQ1 will include GPT interaction logs, teaching and learning interaction metrics, and learner responses to brief relevance and utility measures. These data will be used to examine patterns of engagement with the Custom GPTs and learners' perceptions of their relevance and utility within the course.

RQ2: To what extent do curated short AI videos support conceptual understanding and application?

Data addressing RQ2 will include video engagement analytics, pre- and post-concept assessments, and rubric-scored course artifacts that require learners to explain and apply AI concepts. Changes in conceptual understanding will be examined across pre- and post-assessments, while course artifacts will provide evidence of learners' ability to apply concepts introduced and reinforced through the curated videos.

RQ3: How do authentic assessments (reflection journals, prompt logs, ethics case) evidence growth in AI literacy across the six sessions?

Data addressing RQ3 will consist of learners' reflection journals, prompt engineering logs, ethical AI case analyses, and other course artifacts. Rubric-based evaluation will be used to examine evidence of development across targeted AI literacy competencies. Reflective and textual artifacts will also be examined for patterns in learners' conceptual understanding, critical evaluation, ethical reasoning, and application of AI across the course.

## DISCUSSION

Beyond its structural innovations, our model demonstrates how AI can reframe the pedagogical relationship between instructor and learner. When AI tools are designed to model transparency, critical reasoning, and iterative feedback, they foster metacognitive growth and a sense of shared authorship in learning. Such integration repositions instructors not as gatekeepers of information, but as facilitators

of discernment, helping students navigate the balance between technological assistance and human judgment. This reframing strengthens the educational process by embedding ethical reflection and learner agency within every phase of design and assessment.

Building on the six-module course architecture and resource set developed in this study, including curated short videos, task-specific Custom GPTs, authentic assessments, and simulations, this paper presents a reusable and replicable blueprint for addressing operational gaps identified in recent reviews of AI in education. Although AI literacy frameworks are conceptually well developed, scholars have noted a lack of concrete models that translate these frameworks into teachable and assessable practice (Zawacki-Richter et al., 2019; Long & Magerko, 2020; Ng et al., 2021). By integrating backward-aligned instructional design, intentional media sequencing, and AI-supported pedagogical agents, this work advances a systematic approach to operationalizing AI literacy across conceptual, practical, evaluative, and ethical domains.

The course design also embeds transparency as a core principle. Learners will submit AI-use declarations with all artifacts, specifying who used AI tools, for what purpose, and how outputs were verified. These declarations included brief rationales critiquing potential limitations or biases, aligning with international policy guidance that identifies transparency and accountability as central to AI literacy (UNESCO, 2021, 2023; OECD, 2023).

## Proposed Instrumentation: Direct and Triangulated Measures

To address persistent concerns regarding validity in AI literacy assessment (Lintner et al., 2024), our model employs a triangulated instrumentation strategy aligned with the study's research questions. Competency was assessed using pre and post concept inventories and scenario-based items targeting evaluative judgment (Long & Magerko, 2020; Ng et al., 2021). Engagement and relevance were measured through multiple data sources, including teaching and learning interaction metrics, video analytics, GPT interaction logs, and brief relevance and utility scales.

Conceptual application was demonstrated through rubric-scored concept maps, structured prompt logs, and short explain-back videos, with learner prior experience considered in interpretation. Ethical reasoning and responsible use were assessed through case study rubrics and AI-use declaration rubrics that emphasized specificity, verifiability, and human judgment. Weekly reflections and course artifacts were analyzed using human-in-the-loop large language model pipelines for keywording, topic modeling, and sentiment analysis (Azevedo et al., 2022). Portfolio transfer was demonstrated through an end-of-course e-portfolio requiring learners to apply competencies in discipline-specific and policy-aligned contexts (Herrington et al., 2010; Holmes et al., 2019).

## Limitations

Our study acknowledges several limitations. Generalizability is constrained by early adopter bias and self-selection, underscoring the need for multi-site sampling. The emergent nature of AI-literacy scales requires ongoing validation and invariance testing across disciplines (Lintner et al., 2024). Attribution challenges arise from concurrent innovations in AI tools and institutional policies, complicating causal inference. Replicability may also be affected by the black box design of LLMs and by platform drift, as rapid updates alter model capabilities and interfaces. Finally, the use of GPT interaction logs and video analytics raises critical data ethics considerations, necessitating privacy-preserving governance and institutional review board (IRB)-aligned consent procedures (UNESCO, 2023).

## Implications

The implications of this work extend across multiple stakeholder groups. For instructors, the provision of ready-to-use prompts, Custom GPT role definitions, authentic assessment rubrics, and transparency templates reduces adoption friction while preserving professional judgment (Mueller, 2005; Mollick & Mollick, 2023). These tools support pedagogical innovation by allowing instructors to focus on facilitating discernment, critical reflection, and ethical engagement rather than mechanical task design. When educators integrate AI with intention and transparency, they model reflective teaching practices that cultivate students' metacognitive awareness and responsible tool use.

For programs and centers, the design offers a scalable model through stackable certificate pathways

and curriculum maps that align program outcomes with AI literacy competencies and institutional policies (UNESCO, 2023; OECD, 2023). This structure enables consistent cross-disciplinary integration while maintaining local flexibility, fostering a shared culture of AI literacy grounded in ethics and inclusivity. Faculty development grounded in this model can move beyond skill acquisition toward pedagogical transformation, supporting critical decisions about when and why to integrate AI.

For researchers, the study provides a remixable and replicable data architecture that integrates engagement metrics, rubric-based artifact evaluations, AI-use declarations, and reflective narratives. This structure enhances cross-study comparability and meta-analytic synthesis, addressing calls for methodological rigor in AI in higher education (Zawacki-Richter et al., 2019; Bond et al., 2024). It also enables examination of affective and relational dimensions of AI use, including trust, agency, and perceived authenticity, which remain underexplored yet central to AI's pedagogical impact.

At the governance level, embedding transparency norms and ethics rubrics within coursework creates a micro-governance layer that can inform institutional AI registries and authorship guidelines (Jobin et al., 2019; UNESCO, 2023). This approach positions classrooms as sites of practiced ethical accountability rather than policy abstraction, with potential to inform broader institutional shifts toward responsible and sustainable AI integration in higher education.

## Future Directions

Future work should prioritize validation studies, including confirmatory factor analysis of competency instruments and interrater reliability training for rubric use. Experimental designs using staggered adoption could help isolate the instructional contributions of Custom GPT scaffolds, video priming, and simulation modalities. Potkalitsky (2025) argues that AI literacy must be discipline specific, introduced after foundational disciplinary knowledge is established, and supported by teacher expertise rather than replacing it. This perspective also underscores the importance of measuring differentiated learning outcomes across contexts.

Systematic data collection from AI literacy courses, including those remixed and replicated from this model, will help address the knowledge asymmetry that contributes to ineffective AI use. Longitudinal research is needed to examine the transfer of competencies into subsequent coursework and workplace contexts, including portfolio re-evaluations at three- to six-month intervals. Equity-focused analyses should assess differential outcomes across disciplines, levels of prior preparation, and media accessibility. Finally, studies comparing resource investment to measurable learning gains will be essential for informing scalable adoption.

## References


Almatrafi, O., Johri, A., & Lee, H. (2024). *A systematic review of AI literacy conceptualization, constructs, implementation, assessment efforts*. Elsevier. https://par.nsf.gov/servlets/purl/10589957.

Azevedo, R., Taub, M., Harley, J. M., Trevors, G., D'Mello, S., & Panadero, E. (2022). Lessons learned and future directions of MetaTutor. *Frontiers in Psychology, 13*, 813632. https://doi.org/10.3389/fpsyg.2022.813632

Babbage, C. (1837). On the mathematical powers of the calculating engine. *Memoirs of the Analytical Society of London, 1*, 1–36. https://doi-org.ezp.twu.edu/10.1007/978-3-642-61812-3_2

Bond, M., Marín, V. I., Zawacki-Richter, O., & Gouverneur, F. (2024). A meta systematic review of artificial intelligence in higher education. *International Journal of Educational Technology in Higher Education, 21*(1), 1–32. https://doi.org/10.1186/s41239-023-00436-z

Chu, H.C., Chen, J.M., & Chen, Y.H. (2022). Artificial intelligence in higher education: Roles and research trends. *Australasian Journal of Educational Technology, 38*(6), 1–20. https://ajet.org.au/index.php/AJET/article/view/7526/1906

Crompton, H., Bernacki, M. L., & Greene, J. A. (2023). Artificial intelligence in higher education: State of the field. *International Journal of Educational Technology in Higher Education, 20*(1), 1–38. https://doi.org/10.1186/s41239-023-00392-8

EDUCAUSE. (2024). *2024 EDUCAUSE Horizon Report: Teaching and learning edition*. https://library.educause.edu/resources/2024/5/2024-educause-horizon-report-teaching-and-learning-edition

Felten, P. (2013) Principles of good practice in SoTL. *Teaching & Learning Inquiry 1*(1), 121-125. https://doi.org/10.20343/teachlearninqu.1.1.121

Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., Luetge, C., Madelin, R., Pagallo, U., Rossi, F., Schafer, B., Valcke, P., & Vayena, E. (2018). AI4People - An ethical framework for a good AI society: Opportunities, risks, principles, and recommendations. *Minds and Machines, 28*(4), 689–707. https://doi.org/10.1007/s11023-018-9482-5

Hargis, J. (2024). Using AI to design a college environmental science course. *Glokalde, 10*(1), Article 1. https://www.glokalde.com/Articles/150/using-generative-artificial-intelligence-to-design-a-college-environmental-science-course

Glessmer, M. S., & Forsyth, R.(2025). Superficially plausible outputs from a black box: Problematising genAI tools for analyzing qualitative SoTL data. *Teaching Learning Inquiry*, 13, 1-9. https://doi.org/10.20343/teachlearninqu.13.4

Hamilton, M, & McCollum, B. (2024) Moving from 'good' to 'great' SoTL: The importance of describing your research epistemological and ontological traditions in your SoTL scholarship. *Teaching & Learning Inquiry, 12*, 1-15. https://doi.org/10.20343/teachlearninqu.12.31

Herrington, J., Reeves, T. C., & Oliver, R. (2010). *A guide to authentic e-learning*. Routledge.

Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign. https://curriculumredesign.org/wp-content/uploads/AIED-Book-Excerpt-CCR.pdf

Jobin, A., Lenca, M., & Vayena, E. (2019). The global landscape of AI ethics guidelines. *Nature Machine Intelligence, 1*(9), 389–399. https://doi.org/10.1038/s42256-019-0088-2

Lintner, T., van der Linden, S., & van den Berg, M. (2024). A systematic review of AI literacy scales. *npj Science of Learning, 9*, 36. https://doi.org/10.1038/s41539-024-00264-4

Lombardi, M. M. (2008). *Making the grade: The role of assessment in authentic learning* (ELI Paper 1). EDUCAUSE Learning Initiative. https://library.educause.edu/resources/2008/1/making-the-grade-the-role-of-assessment-in-authentic-learning

Long, D., & Magerko, B. (2020). What is AI literacy? Competencies and design considerations. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–16. https://doi.org/10.1145/3313831.3376727

Lovelace, A. A. (1843). Sketch of the analytical engine invented by Charles Babbage, Esq. *Scientific Memoirs, 3*, 666–731. https://www.cumlingus.com/wp-content/uploads/2025/01/Menabrea_Sketch.pdf

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson.

Mollick, E. R., & Mollick, L. (2023). Using AI to implement effective teaching strategies in classrooms. *SSRN*. https://doi.org/10.2139/ssrn.4391243

Mueller, J. (2005). The authentic assessment toolbox: Enhancing student learning through online faculty development. *Journal of Online Learning and Teaching, 1*(1), 1–7. https://jolt.merlot.org/documents/vol1_no1_mueller_001.pdf JOLT

Ng, D. T. K., Leung, J. K. L., Chu, S. K. W., & Qiao, M. S. (2021). Conceptualizing AI literacy: An exploratory review. *Computers and Education: Artificial Intelligence, 2*, 100041. https://doi.org/10.1016/j.caeai.2021.100041

OECD. (2023). *OECD AI policy observatory: AI in education*. Organisation for Economic Co-operation and Development. https://oecd.ai

Ouyang, F., & Jiao, P. (2021). Artificial intelligence in education: The three paradigms. *Computers and Education: Artificial Intelligence, 2*, 100020. https://doi.org/10.1016/j.caeai.2021.100020

Potkalitsky, N. (2025) The knowledge asymmetry problem: Why student expertise matters in AI collaboration. *Educating AI*. https://nickpotkalitsky.substack.com/p/the-knowledge-asymmetry-problem-why?utm_source=post-email-title&publication_id=1803227&post_id=178633779&utm_campaign=email-post-title&isFreemail=true&r=qvnyf&triedRedirect=true&utm_medium=email

Ruda, F. (2017). Hegel's rabble: An investigation into Hegel's philosophy of right. *Bloomsbury Academic*.

Turing, A. M. (1950). Computing machinery and intelligence. *Mind, 59*(236), 433–460. https://doi.org/10.1093/mind/LIX.236.433

UNESCO. (2021). *AI and education: Guidance for policy-makers*. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000376709

UNESCO. (2023). *Guidance for generative AI in education and research*. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000386693

Upton, B. (2025). *The reckoning: Training authentically skilled graduates in the age of generative AI*, Inside Higher Ed.

U.S. Department of Education, Office of Educational Technology. (2023). *Artificial intelligence and the future of teaching and learning: Insights and recommendations*. https://www.ed.gov/sites/ed/files/documents/ai-report/ai-report.pdf

Wiggins, G., & McTighe, J. (2005). *Understanding by design* (Expanded 2nd ed.). Association for Supervision and Curriculum Development.

Wiley, D., & Hilton, J. (2018) Defining OER-enabled pedagogy. *International Review of Research in Open & Distributed Learning, 19*(4), 134-146.

Yıldızhan Bora, B., & Şahin Kölemen, C. (2025). Integrating AI into instructional design: A case study on digital photography education in higher education. *Contemporary Educational Technology, 17*(3), ep583. https://doi.org/10.30935/cedtech/16433

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – Where are the educators? *International Journal of Educational Technology in Higher Education, 16*(39), 1–27. https://doi.org/10.1186/s41239-019-0171-0

## APPENDICES
## Appendix A

We offer a big-picture take in this first appendix as a way to better understand the way the learning experience has been crafted. Each of the six modules follows a consistent instructional sequence, moving from easier to more difficult, simple to complex:

1. Module Title and Author
2. Welcome. Framing the purpose, relevance, and connections to prior learning.
3. Pre-Assessment. A short, low-stakes diagnostic.
4. Learning Experience Overview. A high-level map, read, watch, discuss, and create.
5. Learning Outcomes. Measurable outcomes using Bloom action verbs.
6. Key Concepts. Critical terms and ideas.
7. Concept Map. A visual map showing how the key concepts connect.
8. Academic Content
9. Academic Readings. Peer-reviewed scholarly sources that ground the module.
10. Audio Podcast. AI-generated audio briefing (NotebookLM).
11. Video Screencast. A concise, guided screencast (NotebookLM).
12. Academic Videos. Curated, scholarly-oriented videos that reinforce readings.
13. Supplemental Videos. Enrichment selections for deeper dives.
14. Simulations. A practice environment (prompt lab, role-play, sandboxed agent).
15. Discussion. Structured prompts that promote interpretation, critique, transfer.
16. Do / Due. Authentic, performance-based artifacts aligned to the outcomes.
17. Post-Assessment. Exactly the same as the Pre-assessment.
18. Feedback Custom GPTs. Targeted AI feedback assistants.
19. References. APA 7th edition format.

This structure ensures alignment with backward design principles, scaffolding from foundational knowledge to authentic application. Each Module is aligned with the Program Learning Outcomes (PLOs) (see table 1).

Learners also receive iterative feedback from Custom GPTs, which provide formative coaching on writing, ethical reasoning, and disciplinary applications. The design deliberately integrates Custom GPTs to scaffold higher-order thinking:

1. Qualitative Text Analysis supports in-depth analysis of large textual datasets by performing advanced functions such as keyword extraction, sentiment analysis, topic modeling, summarization, and thematic clustering. The tool enables dataset comparison, pattern and theme identification, and the generation of tables, graphs, and visual summaries to support interpretation and presentation.
2. The Teaching Philosophy guide helps faculty articulate core principles of effective teaching by supporting the development of clear, outcome-focused ideas and examples of how learners achieve those outcomes. The GPT assists educators in crafting an effective and personalized teaching statement or philosophy through a structured, reflective process that includes tailored prompts, illustrative examples, and language suggestions aligned with each educator's unique experiences and teaching style.
3. The Research Agenda Assistant supports faculty in articulating their research accomplishments, current projects, and future scholarly directions. This GPT helps users develop clear and compelling research agendas, particularly for academic job applications, by guiding them through the structured presentation of past work, ongoing research, and future plans.
4. Effective Teaching Evidence is grounded in Wiggins and McTighe's backward design framework for assessment, measurement, and evaluation. This GPT supports faculty in collecting, interpreting, and reflecting on multiple forms of evidence of teaching effectiveness, including peer and self-evaluations, teaching videos, pedagogical research, and teaching portfolios. It provides a structured, research-informed guide for faculty development, particularly in preparation for tenure, promotion, or ongoing instructional improvement.
5. Course Design Studio guides faculty through the course design process using a backward design model. This GPT functions as a course design coach for faculty participating in the Course Design Studio, grounded in the Wiggins and McTighe backward design framework and informed by the curriculum.
6. Syllabus AI Policy Statement is designed to help faculty craft clear, values-aligned AI policy

statements for their courses. It offers templates, and ensures policies promote academic integrity, inclusivity, and ethical AI use.

7. AI Literacy Feedback gives supportive feedback on foundational AI and reflection assignments. The AI literacy teaching assistant is designed to provide clear, constructive, and formative feedback, helping learners articulate foundational AI concepts, including: ANI vs AGI, Machine learning (supervised, unsupervised, reinforcement), Neural Networks, Deep Learning, Natural Language Processing, Large Language Models (LLMs), Chain-of-Thought, Retrieval-Augmented Generation, and Agentic AI. Identifies these concepts in real-world, educational, and professional contexts. Reflects critically on their relevance, implications, and ethical considerations.
8. AI Literacy Module 1 Session 1: What is AI? introduces foundational concepts by examining the core components, historical development, and real-world applications of artificial intelligence. This module establishes a conceptual framework that supports deeper understanding of how AI functions and how it is situated within both historical and contemporary technological contexts.
9. AI and Academic Integrity examines the transforming role of AI in educational assessment, detailing both its opportunities (e.g. new assessment models, learning analytics) and its challenges (e.g. plagiarism, fairness, accountability). The tool aims to help educators, researchers, and students understand how AI impacts the norms, practices, and ethics of academic integrity.
10. Integrating AI into Work and Life aims to guide users in how to thoughtfully embed AI tools into daily routines and workflows. Integrating AI is more than simply adopting a new tool; it's about strategically matching AI's strengths to your goals while recognizing its limitations.
11. AI in Action case studies provides role-tailored case studies to help users apply artificial intelligence in concrete, real-world scenarios. It is designed to support practitioners, educators, and professionals in understanding how AI can be operationalized in their specific contexts.

## Appendix B

The outline below is a synthesis of Module 3. We invite readers to read through and conceptualize the module first, then to click the overview and engage with the material provided as a way of learning and knowing the class we have crafted. Central to our paper, this class and its creation with the assistance of GenAI, promotes learner agency, manifest in what the reader remixes and reuses. Our pedagogy for generative technology and internet 3.0 is anchored in leaner agency.

**Key Sections of Module 3:** AI Ethics and Responsible Use

- **Welcome to Module 3**. This module is designed to be interactive and reflective. You'll engage with case studies, ethical frameworks, and scenario-based simulations that emphasize human agency, responsible decision-making, and the role of AI as a thinking partner—not a replacement—for human judgment.
- **Learning Experience Overview.** In this module, you will critically examine the ethical dimensions of AI in education and society. We will explore how fairness, accountability, transparency, bias, privacy, and human dignity intersect with AI use. Rather than viewing ethics as a checklist, this module invites you to engage in ethical reasoning and reflection—skills essential for anyone using or designing AI systems.
- **What to Expect in Module.**
    - Academic Readings & Videos
    - Interactive Simulations
    - Reflection & Discussion
    - Applied Tasks
- **How You Will Learn**. You will learn through a **human-centered approach** combining readings, multimedia resources, simulations, and reflective writing. This multi-modal design allows you to not only analyze abstract principles but also apply them to practical, real-world settings in teaching, research, and professional practice. Peer dialogue and AI-assisted feedback tools will help you refine your ethical reasoning and develop actionable insights.
- **Why This Matters**. Ethical literacy in AI is not optional—it is foundational to responsible innovation. As educators, researchers, and professionals, we shape the values that underlie technology use.
- **Action Step:** Take a few minutes now to write your response to the pre-assessment prompt. Be as honest and reflective as possible—there are no "right" answers. Your ethical journey starts here
- **Pre-Assessment Prompt:** "What does ethical AI use mean to you in education, and why does it matter?" Response is analyzed by Ethical AI Diagnostic Custom GPT formative assessment using criteria aligned with the Ethical AI Frameworks.
- **Learning Outcomes**. By the end of this module, learners will:
    - Identify ethical risks and responsibilities related to AI in higher ed;
    - Apply ethical frameworks to assess fairness, transparency, and accountability in AI use; and
    - Analyze AI case studies and articulate informed responses using evidence-based reasoning.
- **Key Concepts.** Fairness, Bias, Transparency, Accountability, Human Agency, Ethical Use of Data, Professional Integrity
- **Concept Map.** (refer to actual syllabus)
- **Academic Readings and Reflections.**
    - AI Ethics in Practice. Published by UC Berkeley's Center for Long-Term Cybersecurity, this report bridges abstract ethical principles and real-world applications. Google NotebookLM Podcast (25 minutes) Google NotebookLM Screencast (7 minutes)
    - Policies for AI in Higher Education: A Call for Action. Ally, M., & Mishra, M. (2024). Policies for AI in higher education: A call for action. *Canadian Journal of Learning and Technology,* *50*(3). Google NotebookLM Podcast (20 minutes) Google NotebookLM Screencast (7 minutes) Substack Blog Summary of Article Integrating Learning Theories
- **Academic Videos.**
    - What is AI Ethics?(6 minutes).
    - How to Implement AI Ethics. (4 minutes).
- **Simulations.**

    - Scenario 1: Plagiarism Detection Tool for Writing assignments. GPT Ethics Case Student for Plagiarism guides in exploring ethical dilemmas in AI plagiarism detection policies.
- **Academic Conten**t (and Embedded Multimedia)
- **Further Learning Material.**
    - **Recommendations for Higher Ed**
- **Resources.**
- **Discussion Prompts.**
    - Which ethical principle (fairness, transparency, privacy, etc.) feels most relevant to your discipline? Why?
    - Share one example of when you've seen an ethical challenge with technology—even outside of AI.
- **Do / Due.** Case Study Analysis: Summarize and evaluate a real-world example of unethical AI use.
- **Feedback Custom GPT**.
    - Ethics Feedback Buddy gives critical feedback on AI ethics course reflections.
- **References.**

## BIODATA and CONTACT ADDRESSES of the AUTHOR/S

Dr. Hou I (Esther) Lau is an Assistant Professor in the Marriage and Family Therapy Program at Texas Woman's University and an AI Fellow focused on the integration of AI in higher education. She is a Licensed Marriage and Family Therapist-Associate in Texas and an AAMFT Approved Supervisor. Her work bridges teaching, research, and clinical innovation, with scholarship on trauma, invisible loss and pain, multiracial identity, couple dynamics, and the ethical use of AI in education and therapy. She has authored peer-reviewed publications and designs AI literacy curricula that advance reflective practice, ethical reasoning, and pedagogical engagement across disciplines. Her current projects examine how emerging technologies can strengthen transparency, equity, and professional judgment, linking technology, research, and human connection to promote growth and resilience in academic and clinical settings.

Hou I (Esther) Lau, PhD, LMFT-Associate
Assistant Professor, Marriage and Family Therapy Program
Texas Woman's University
hlau2@twu.edu
ORCID: 0000-0001-5058-1120

Dr. Jace Hargis is currently an AI in higher education researcher with a focus on teaching and learning. He consults on the strategic integration and ethical application of AI across academic, research, and administrative domains. His global academic leadership and consulting spans roles in the United States (California, Florida, New Jersey and Hawaii), the Middle East (United Arab Emirates, Saudi Arabia and Qatar), Asia (China, Malaysia and Pakistan), Europe (Netherlands, UK, Romania and Turkey) and New Zealand, where he has held faculty and senior administrative positions supporting teaching and learning innovation. Dr. Hargis is the author of a textbook and an academic anthology, and has published over 150 peer-reviewed articles. He is also an accomplished presenter, having delivered hundreds of academic presentations internationally. He holds a B.S. in Oceanography from the Florida Institute of Technology, an M.S. in Environmental Engineering Sciences, and a Ph.D. in Science Education from the University of Florida. His current research centers on how people learn, with a particular emphasis on the integration of emerging technologies, most recently, AI into educational environments.

Jace Hargis, PhD
AI in Higher Ed Researcher
jace.hargis@gmail.com
ORCID: 0000-0002-9372-2533

Dr. Brooke Carlson teaches rhetoric and composition, literature and Shakespeare, under the auspices of a general education at an institution of higher education. Raised in Colorado, the son of public-school teachers, Dr. Carlson earned a bachelor's degree in English and French at Bowdoin College, taught high school English for five years in Portland, Maine, and then earned a PhD in Early Modern Literature under the direction of the late Bruce R. Smith, at the University of Southern California. Dr. Carlson taught internationally in Seoul, South Korea, on the island of Oahu in Hawai'i, and in Grand Junction, Colorado, and has published on, among other things: Shakespeare in Korea; rubrics, assessment, and equity; and (teaching) GenAI.

Brooke Carlson, PhD
Independent Researcher
brooke.carlson@gmail.com
ORCID: 0009-0000-8138-5894