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Transmitting Traditional Chinese Culture in Educational Psychology Course with AI Empowerment: A Study Based on the ASSURE Model

Jiewen Chen, You Chen*

College of Foreign Studies, Guangdong University of Science and Technology, Dongguan, Guangdong, 523083, China
**Corresponding Author*

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Abstract: This study investigates how artificial intelligence (AI) can enhance the transmission of Traditional Chinese Culture (TCC) within an undergraduate Educational Psychology course through an AI-enhanced ASSURE instructional design framework. Using design-based research with four iterative cycles, the study integrates AI tools-including learner analytics, generative dialogues, and virtual reality cultural scenarios-into each phase of the ASSURE model to support culturally grounded, discipline-embedded learning. A mixed-methods approach collected quantitative data from pre- and post-tests and qualitative data from classroom observations, AI analytics, student artefacts, reflective journals, and interviews with eight representative students. Results show significant improvements in students' TCC knowledge, cultural expression, intercultural competence, and learning motivation. Qualitative findings further reveal that AI-mediated experiences deepened cultural understanding, strengthened links between Confucian and Western psychological theories, and enhanced learner agency and identity expression. The study contributes a replicable model for integrating TCC into disciplinary courses and demonstrates that AI, when aligned with structured instructional design, can meaningfully support cultural transmission, conceptual understanding, and identity development in higher education.

1. Introduction

The rapid development of artificial intelligence (AI), particularly generative AI, has opened new possibilities for enhancing teaching and learning in higher education. AI tools such as adaptive analytics, conversational agents, and immersive virtual environments are increasingly recognized for their ability to support learner engagement, differentiated instruction, and deeper conceptual understanding. However, their potential in culturally grounded pedagogy remains insufficiently explored, especially in the context of transmitting Traditional Chinese Culture (TCC) within discipline-based courses. At the same time, Chinese universities face growing expectations to

cultivate students' cultural confidence and integrate TCC meaningfully into academic learning rather than treating it as an isolated or moralistic supplement.

Educational Psychology provides a valuable platform for such integration because many Confucian educational ideas-such as "ren'ai" (benevolence), learning as a moral-cognitive process, and "yin cai shi jiao" (teaching according to individual aptitudes) [1]-resonate with Western theories including Vygotsky's scaffolding [2, 3] and Bandura's social learning [4]. Yet these connections rarely appear explicitly in existing curricula, limiting students' ability to understand culture as an epistemic resource. To address this gap, the ASSURE instructional design model (proposed by Heinich, Molenda, Russell, and Smaldino) offers a structured pathway for aligning objectives, media, activities, and evaluation in culturally responsive ways [5]. When enhanced with AI tools such as VR cultural scenarios, AI-generated dialogues, and data-driven learner analysis, the model holds strong potential for transforming TCC transmission into an immersive and discipline-embedded learning experience.

This study develops and examines an AI-enhanced ASSURE framework implemented in an undergraduate Educational Psychology course. Using design-based research and mixed methods, the study investigates how AI-mediated instructional design supports students' cultural understanding, disciplinary reasoning, and identity expression. The findings aim to contribute a replicable model for AI-supported cultural integration and offer insights into the evolving role of AI in culturally responsive higher education.

2. Literature Review

The rapid development of AI in education has reshaped how learning is designed, delivered, and experienced. Recent studies highlight the expanding role of generative AI tools-such as conversational agents, multimodal content generators, and intelligent analytics-in supporting personalized instruction, formative assessment, and cognitive scaffolding [6, 7]. These technologies not only automate routine tasks but also enable new forms of dialogic learning, simulation-based experiences, and data-informed decision-making. AI-enhanced learning environments have been shown to improve learner engagement, motivation, and conceptual understanding, particularly when aligned with clear pedagogical goals [8]. However, scholars caution that AI integration must remain grounded in instructional design principles to avoid superficial or technocentric implementation. Rather than serving as a stand-alone innovation, AI is most effective when embedded within coherent learning sequences that support active meaning-making and identity development.

Parallel to advances in AI, the transmission of TCC has gained renewed attention in Chinese higher education. TCC encompasses rich intellectual traditions-Confucian, Taoist, and classical educational philosophies-that continue to inform contemporary moral, cognitive, and pedagogical thought. Research on culturally responsive education suggests that connecting students' cultural heritage with academic content can enhance learning relevance, strengthen identity, and promote cross-cultural competence [9]. Yet studies also reveal persistent challenges: TCC education often appears fragmented, overly theoretical, or detached from disciplinary knowledge, leading to limited student engagement and superficial cultural understanding [10]. Many courses present TCC as moral instruction rather than as a set of analytical resources comparable to Western theories [11]. As a result, students struggle to see how cultural concepts can function as epistemic tools within modern academic fields such as psychology, pedagogy, or educational sciences.

Educational Psychology offers an underexplored but promising site for integrating TCC, given its conceptual resonance with classical Chinese educational thought. Concepts such as "yin cai shi jiao" (teaching according to individual aptitudes), "ren'ai" (benevolence), and the Confucian view of learning as moral-cognitive cultivation parallel key Western frameworks including Vygotsky's

ZPD, Bruner's scaffolding, and Bandura's observational learning. Despite these connections, existing literature seldom highlights how TCC can be systematically embedded into disciplinary instruction in ways that support conceptual comparison and cultural identity formation. Instead, most studies focus on general cultural appreciation or ideological education, leaving a gap in research on culture-informed disciplinary learning.

Instructional design research provides further insight into how culturally grounded content can be integrated through structured pedagogical processes. The ASSURE model-Analyze Learners, State Objectives, Select Media, Utilize Media, Require Participation, and Evaluate & Revise-is widely recognized for guiding systematic media integration in classrooms. Prior research demonstrates that ASSURE helps align goals, materials, and assessments, thereby supporting active and meaningful learning. However, few studies have examined how ASSURE can be combined with AI technologies to support cultural learning, nor how the model can be adapted to promote TCC transmission in discipline-specific contexts. Existing work typically applies ASSURE to technological skill development, multimedia teaching, or general instructional planning, leaving unexplored its potential to support culturally responsive and AI-enhanced pedagogy.

Taken together, the literature indicates three major gaps: the lack of systematic models for integrating TCC into disciplinary courses; limited research on AI-supported cultural meaning-making; and insufficient exploration of how instructional design frameworks like ASSURE can be enhanced to support culturally grounded learning. Addressing these gaps, the present study develops an AI-enhanced ASSURE framework for embedding TCC into an Educational Psychology course and examines its effectiveness through mixed methods and design-based research. This approach contributes both theoretically and practically to the fields of AI in education, culturally responsive pedagogy, and instructional design.

3. Methodology

3.1 Research Design

This study adopts a design-based research (DBR) design to develop, implement, and refine an AI-enhanced ASSURE framework for embedding TCC in an Educational Psychology course. DBR is well suited to studies that aim to generate both theoretical insights and practical innovations through iterative cycles of design, implementation, evaluation, and revision. The AI-enhanced ASSURE framework-involving the steps Analyze Learners, State Objectives, Select Media & Materials, Utilize Media & Materials, Require Learner Participation, and Evaluate & Revise-naturally aligns with the cyclical logic of DBR. Each phase of ASSURE corresponds to one or more DBR cycles, allowing continuous improvement of both the instructional design and cultural integration strategies. The research was conducted across four iterative cycles, each focusing on improving the integration of AI tools (analytics, generative dialogues, VR cultural scenarios) and enhancing TCC-related learning outcomes. Findings from each cycle informed revisions to the learning objectives, media selection, instructional strategies, and evaluation mechanisms.

3.2 Case Study Context

A single-case study design was employed to provide an in-depth understanding of how AI-enabled instructional design functions in an authentic classroom context. The case was an undergraduate Educational Psychology course offered at a comprehensive university in South China. The class consisted of 43 students, primarily third-year majors in education-related programs. The course traditionally emphasizes psychological theories such as Vygotsky's Zone of Proximal Development (ZPD), motivation theory, and learning processes. In this study, these disciplinary

concepts were explicitly linked to Traditional Chinese Culture-for example, comparing Vygotsky's ZPD with the Confucian notion of "teaching according to individual aptitudes." The course served as an ideal site for examining how AI tools can support the cultural contextualization of psychological concepts within a formal curriculum.

3.3 Participants

The participants in this study consisted of 38 undergraduate students enrolled in an Educational Psychology course, one course instructor with expertise in educational technology and the integration of TCC, and three external reviewers who served as teaching supervisors providing cross-evaluations during the DBR cycles. All participation was voluntary. Students were informed of the purpose of the research and provided consent for the use of their anonymous data. To ensure confidentiality, pseudonyms were assigned to all participants, and identifiable information was removed from classroom observations, interview transcripts, and project artefacts.

3.4 Procedure

The study was implemented across four design-based research cycles, each corresponding to a key phase of the ASSURE instructional design framework. In the first cycle, the Analyze Learners phase, AI-generated surveys were used to assess students' prior knowledge of TCC, their familiarity with Confucian educational concepts, and their patterns of technology use, while learning analytics identified knowledge gaps and preferred learning modalities. In the second cycle, corresponding to the State Objectives phase, the course learning objectives were revised to explicitly integrate TCC, enabling tasks such as comparing Vygotskian scaffolding with the Confucian principle of "teaching according to individual aptitudes" to become central analytical activities. The third cycle aligned with the Select and Utilize Media phases, during which AI-generated dialogues simulating conversations with historical cultural figures and VR cultural scenarios depicting rituals, classrooms, and heritage sites were embedded into lectures, group activities, and out-of-class tasks. The fourth cycle focused on the Require Participation and Evaluate phases, where students engaged in AI-assisted cultural interpretation projects-including VR role-playing, chatbot-based inquiry, and collaborative storytelling-followed by surveys, reflections, and analytics-based evaluations. Insights from each cycle informed iterative refinements, allowing the framework to be continuously improved.

3.5 Data Collection

Data collection followed a mixed-methods approach designed to capture both quantitative outcomes and qualitative learning processes. Quantitative data were gathered through pre-test and post-test questionnaires measuring students' TCC knowledge (8 items), cultural expression ability (6 items), intercultural competence (6 items), and learning motivation (5 items), complemented by Likert-scale evaluations of AI and VR tools; reliability analyses indicated strong internal consistency, with Cronbach's α values ranging from 0.81 to 0.89. Qualitative data were drawn from multiple sources, including classroom observations conducted during each DBR cycle, AI learning analytics reports, and students' project artefacts such as AI-generated dialogues and VR role-play recordings. Additional qualitative evidence came from reflective journals, cultural interpretation essays, and semi-structured interviews with eight representative students (see Table 1), alongside instructor field notes documenting instructional decisions and pedagogical reflections. Together, these data sources provided rich and triangulated evidence of how the AI-enhanced ASSURE model functioned in practice.

Table 1: Demographic Characteristics of the Eight Interviewees

Student ID	Gender	Age	Major	Year of Study	Learning Background with TCC	Prior Experience with AI Tools	Participation Style in Class
S1	F	20	English Education	Year 3	Limited	Moderate	Quiet / Low Confidence
S2	M	21	English Education	Year 3	Moderate	High	Active Participant
S3	F	20	English Education	Year 3	Limited	High	Moderately Active
S4	F	21	English Education	Year 3	Low	High	Reflective / Analytical
S5	M	22	English Education	Year 3	Moderate	Moderate	Quiet but Engaged
S6	F	20	English Education	Year 3	Limited	Moderate	Active in Group Work
S7	M	21	English Education	Year 3	Low	High	Highly Engaged
S8	F	22	English Education	Year 3	Moderate	Moderate	Steady / Consistent Participant

3.6 Data Analysis

A mixed-methods analytic strategy was employed to examine both the measurable outcomes and the learning processes associated with the AI-enhanced ASSURE framework. Quantitative analysis involved comparing pre-test and post-test scores using paired-sample t-tests to determine improvements in students' TCC knowledge, cultural expression ability, intercultural competence, and learning motivation, while descriptive statistics such as means, standard deviations, and response frequencies were used to evaluate students' perceptions of AI-enhanced learning activities. Complementing this, qualitative analysis was conducted through thematic coding using NVivo, which allowed recurring patterns to emerge in areas such as cultural understanding, student engagement, identity expression, perceived usefulness of AI tools, and challenges encountered during the learning process. Cross-cycle comparisons provided insight into how the framework evolved through iterative refinement and identified which instructional adjustments contributed to greater effectiveness in later cycles. To ensure the credibility and robustness of the findings, triangulation was carried out across multiple data sources-including classroom observations, interview transcripts, AI-generated analytics, and student project artefacts-thus offering a comprehensive and integrative understanding of the impact of the AI-enhanced ASSURE model.

4. Results

4.1 Overview of Data Sources

Data for this study were drawn from multiple sources generated throughout the implementation of the AI-enhanced ASSURE framework in an Educational Psychology course with 43 third-year students majoring in education-related fields. Quantitative evidence was collected from pre-test and post-test questionnaires focusing on students' TCC knowledge, cultural expression ability, intercultural competence, and learning motivation, supplemented by Likert-scale evaluations of AI

and VR tools used during instruction. Qualitative evidence included classroom observations during each DBR cycle, students' AI-assisted artefacts such as digital dialogues and VR role-plays, weekly reflective journals, course assignments, and analytics reports generated by AI tools. Additionally, semi-structured interviews were conducted with eight representative students selected to capture diverse learning profiles, engagement patterns, and cultural perspectives. Instructor field notes and external reviewers' evaluations further contributed to triangulation. Together, these data sources provided a comprehensive picture of both the measurable outcomes and the evolving learning processes that occurred during the iterative implementation of the AI-enhanced ASSURE model.

4.2 Quantitative Results

Quantitative analysis revealed significant improvements across all four measured learning domains following the implementation of the AI-enhanced ASSURE framework. Students' TCC knowledge exhibited a marked increase, rising from a pre-test mean of 3.02 to a post-test mean of 4.21, indicating stronger comprehension of Confucian pedagogical principles and their relationship to Western psychological theories such as Vygotsky's ZPD. Cultural expression ability also improved substantially, with scores increasing from 2.89 to 4.07; students demonstrated enhanced ability to articulate cultural ideas in written reflections and AI-supported learning tasks. Intercultural competence showed similar gains, rising from 3.11 to 4.15, suggesting greater confidence and skill in comparing Chinese and Western learning perspectives. Learning motivation improved from 3.45 to 4.30, reflecting increased engagement attributed to the use of AI dialogues, VR cultural scenarios, and adaptive media. Paired-sample t-tests confirmed that all improvements were statistically significant at $p<0.001$. Descriptive feedback further indicated that students found AI-mediated interactions more immersive and helpful for understanding abstract cultural and psychological concepts. Collectively, these results demonstrate that the AI-enhanced ASSURE framework substantially strengthened students' cognitive and affective learning outcomes.

4.3 Qualitative Findings from DBR Cycles

Qualitative findings from classroom observations, student artefacts, AI analytics, and interviews with eight representative students indicate clear developmental changes across the four DBR cycles, revealing how the AI-enhanced ASSURE framework shaped students' cultural understanding and learning engagement.

During the first cycle, AI-driven analysis exposed substantial gaps in prior TCC knowledge, with 6 out of 8 interviewees (75%) reporting that they had "little or only superficial understanding" of Confucian pedagogical ideas before the course. Several students expressed surprise at the relevance of TCC to educational psychology; for example, S4 remarked, "I never realized that teaching according to individual aptitudes could be connected with something like ZPD-it felt like discovering a missing puzzle piece." At this stage, five students (63%) described feeling initially uncertain about how cultural learning would integrate with psychological theory, prompting the instructor to refine learning objectives with clearer cultural scaffolding in Cycle 2.

In the second cycle, the inclusion of explicit cultural learning objectives helped students better understand the academic function of TCC within the course. Seven out of eight interviewees (88%) reported that the stated objectives made cultural concepts appear "legitimate," "discipline-related," and "not just extra content." S2 stated, "Seeing Confucian ideas listed as official objectives made me feel that our culture wasn't optional-it belonged in the psychology classroom." Students also described increased motivation and relevance, with six interviewees (75%) noting a stronger connection between their identity and disciplinary learning. Classroom observations confirmed that

discussions became more culturally grounded, with students more frequently referencing TCC during theoretical analysis.

Cycle 3 marked a major shift in engagement as AI-generated dialogues and VR cultural scenarios were introduced. Immersive VR scenes had a strong impact, with all eight interviewees (100%) expressing that VR significantly deepened their understanding of cultural practices; S7 commented, "Entering the VR Confucian classroom made me feel the atmosphere of respect and ritual-I understood the cultural logic of learning more deeply than from reading." AI dialogues also improved students' comparative reasoning, with six interviewees (75%) stating that the dialogues helped them articulate similarities and differences between Chinese and Western theories. S3 noted, "The conversation between Confucius and Vygotsky helped me compare the theories in a way I couldn't have done alone." Project artefacts from this cycle showed more coherent cultural interpretations, reflecting the cognitive support provided by the AI tools.

In the fourth cycle, participation-based activities-such as AI-assisted cultural interpretation projects and VR role-play-further strengthened students' cultural expression and identity engagement. Seven out of eight students (88%) reported that these tasks helped them better understand how their own learning habits reflect both traditional values and modern psychology. For example, S5 shared, "I realized my learning style is shaped by both my parents' expectations and the theories we study. The project helped me connect these two worlds." Additionally, five students (63%) who described themselves as "quiet" or "less confident" reported that AI-assisted rehearsal reduced anxiety and increased their willingness to speak in class; S1 explained, "Practicing with AI first made me confident to express Chinese culture in my own words." Observations further showed that students began producing richer, more integrated cultural–psychological analyses throughout this cycle.

Across all four DBR cycles, qualitative data demonstrated a clear progression from simple recognition of cultural content to deeper integration of TCC within psychological frameworks and, ultimately, to expressions of personal cultural identity. AI tools-especially VR simulations and generative dialogues-played a central role in facilitating this progression, offering emotionally engaging experiences and low-stakes exploratory spaces. External reviewers who observed the later cycles described the implementation as "increasingly coherent and culturally grounded," indicating that iterative refinement improved instructional alignment. Overall, the qualitative evidence suggests that the AI-enhanced ASSURE framework effectively promoted cultural understanding, engagement, and identity formation, consistently supporting the quantitative improvements observed in students' learning outcomes.

5. Discussion

The findings of this study demonstrate that the AI-enhanced ASSURE framework effectively strengthened students' cultural understanding, disciplinary learning, and identity formation within an Educational Psychology course. Quantitative improvements across TCC knowledge, cultural expression, intercultural competence, and motivation indicate that integrating Traditional Chinese Culture as a disciplinary dimension-rather than an optional supplement-can generate meaningful cognitive and affective gains. These results align with previous research suggesting that AI-supported learning environments can deepen conceptual understanding and foster engagement (Holmes, 2023; Luckin, 2025). What distinguishes this study, however, is the way AI tools were intentionally aligned with instructional design principles to create culturally grounded learning experiences, showing that well-structured integration matters more than simply inserting technology into the curriculum.

The qualitative findings offer deeper insight into the mechanisms underlying these improvements. The progression across DBR cycles reveals that students did not merely learn more about culture; they learned through culture, using AI-mediated comparisons, immersive environments, and dialogic tools to build connections between Confucian pedagogical principles and Western psychological theories. This reflects Biggs's notion of constructive alignment [12], as the ASSURE phases created a coherent pathway in which objectives, media, activities, and assessments supported learners in constructing understanding. The VR cultural scenarios, in particular, served as powerful mediational tools, enabling students to grasp the lived dimensions of cultural practices-a finding consistent with sociocultural learning theories emphasizing contextualized experience. The interview evidence that 100% of participants found VR helpful underscores the importance of affective engagement in cultural learning, suggesting that immersive technologies can bridge the gap between abstract cultural concepts and embodied understanding.

The results also highlight the ways in which AI tools supported learner agency and identity expression. Many students, especially those who identified as quiet or less confident, reported that AI-assisted rehearsal helped them articulate ideas more confidently and take intellectual risks in class. This suggests that AI dialogues served as a form of "low-stakes cognitive apprenticeship," where learners could explore and refine cultural interpretations before entering public discussion. Such findings contribute to growing discussions on the role of AI in supporting learner autonomy and identity development. In this study, AI was not positioned as a knowledge provider but as an interactive partner that helped students articulate and expand their cultural reasoning. Importantly, identity-related reflections emerged most strongly in the later DBR cycles, indicating that identity expression is a developmental outcome that requires sustained support rather than a one-time intervention.

Furthermore, the alignment between AI capabilities and ASSURE's structured phases appears crucial. The Analyze Learners phase provided data-driven insights that informed subsequent instructional decisions; the State Objectives and Select Media phases ensured cultural and psychological goals were embedded with clarity; the Utilize and Require Participation phases enabled active learning through multimodal engagement; and the Evaluate and Revise phase facilitated iterative refinement. This synergy between AI and instructional design echoes calls in the literature for purposeful, pedagogically informed uses of technology rather than superficial adoption. By demonstrating how each ASSURE phase can be enhanced with AI, this study extends existing models of AI-supported pedagogy and offers a replicable structure for future cultural or disciplinary integration.

Finally, the study contributes to broader conversations about the place of Traditional Chinese Culture in higher education. Students' interview responses-such as perceiving cultural content as "legitimate" and "belonging in psychology"-suggest that culturally embedded curricula can help bridge tensions between globalized disciplinary knowledge and local cultural heritage. The framework enabled students to see TCC not as a nostalgic or moralistic element but as a meaningful theoretical resource comparable in analytical value to Western frameworks. This positions TCC as an epistemic partner rather than a decorative identity marker, which holds implications for curriculum design in multilingual and multicultural contexts.

6. Conclusion

6.1 Summary of Key Findings

The present study demonstrates that the AI-enhanced ASSURE framework offers an effective and pedagogically coherent approach to integrating TCC into an Educational Psychology course. Through the combined strengths of design-based research, case-based implementation, and

mixed-method evaluation, the study provides strong evidence that AI-mediated tools-when purposefully aligned with instructional design-can substantially enhance students' TCC knowledge, cultural expression, intercultural competence, and learning motivation. The iterative DBR cycles illustrate that cultural learning is not a single event, but an evolving process requiring clear objectives, immersive media, active participation, and continuous refinement. Importantly, the findings show that integrating TCC as a disciplinary component, rather than supplemental content, enables learners to understand culture not only as heritage but as an analytical lens for interpreting learning theories and educational practices. The study ultimately confirms that AI technologies, when combined with structured pedagogical models, can create culturally meaningful, emotionally engaging, and intellectually rigorous learning experiences that support identity development and disciplinary understanding.

6.2 Implications

The findings carry several theoretical and practical implications for AI-supported education and culturally grounded pedagogy. Theoretically, the study advances existing literature by showing how AI tools can operationalize constructive alignment within a culturally responsive framework. It demonstrates that AI is most effective not as an isolated intervention but as a mediational tool embedded within a sequence of structured design decisions. This contributes to a more nuanced understanding of how AI-enabled instruction can support cultural interpretation, identity expression, and conceptual integration across diverse educational contexts. Practically, the study provides a replicable instructional model for educators seeking to incorporate TCC or other cultural content into discipline-based courses. The success of AI dialogues and VR cultural scenarios suggests that teachers can leverage generative AI and immersive media to make abstract cultural concepts concrete and emotionally resonant. Additionally, the finding that AI-assisted rehearsal increased the confidence of quiet or hesitant students offers a new perspective on fostering inclusive participation. For curriculum designers and administrators, the study highlights the value of integrating cultural objectives explicitly into course syllabi and aligning them with assessment and media selection, ensuring that cultural learning becomes a coherent, discipline-relevant endeavor rather than fragmented add-on content.

6.3 Limitations and Future Research

Despite its contributions, this study has several limitations that warrant attention in future research. First, the sample involved a single class of 43 students from an English Education program, which may limit the generalizability of the findings to other disciplines or institutional contexts. Future studies could test the AI-enhanced ASSURE framework across different majors or universities to assess transferability. Second, the duration of the intervention was limited to one semester, and long-term effects on cultural identity development or disciplinary learning were not measured. Longitudinal studies could provide deeper insight into how culturally integrated, AI-supported learning influences students over longer periods. Third, although the study employed a mixed-method approach, the quantitative measures relied primarily on self-reported scales, which may be influenced by students' perceptions rather than objective cultural competence. Future research could incorporate performance-based assessments or behavioral analytics to triangulate learning outcomes. Finally, the rapid evolution of AI technologies means that the specific tools used in this study may soon be replaced by more sophisticated systems. Continued research is needed to evaluate how emerging AI capabilities-such as multimodal generative models or adaptive cultural tutoring systems-can further enhance culturally grounded learning. Addressing these limitations will

deepen understanding of how AI and pedagogical design can work together to support meaningful cultural transmission in contemporary higher education.

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