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From Enhancement to Transformation: AI Pedagogy through Mindset, Specialised Training, and Structured Support

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ABSTRACT

CONTEXT

Artificial intelligence (AI) is a transformative technology with significant implications for reshaping teaching and assessment practices in higher education. However, despite growing access to powerful AI tools, their integration by academics often remains limited to basic enhancements rather than fostering deeper pedagogical transformation. This creates a critical gap between individual experimentation and sustainable, institution-wide innovation.

PURPOSE OR GOAL

This paper examines the dynamics influencing AI adoption among academics in higher education, focusing on the drivers and barriers they encounter when integrating AI into teaching and assessment. It also explores how personal motivations and Communities of Practice (CoPs) shape their progression from enhancement-level use to more transformative applications.

APPROACH OR METHODOLOGY/METHODS

Our study employed a qualitative research design using a collaborative autoethnography approach with a structured questionnaire. The data were analysed using thematic analysis, to explore AI adoption experiences of eight academics in the computing and information systems field at an Australian university. The analysis was guided by four theoretical lenses: the Unified Theory of Acceptance and Use of Technology (UTAUT), Technological Pedagogical Content Knowledge (TPACK), Community of Practice (CoP) and Substitution, Augmentation, Modification, and Redefinition (SAMR) model. These frameworks were used to explore both individual and community-level influences on academics' intentions and behaviours related to AI adoption.

ACTUAL OR ANTICIPATED OUTCOMES

Our findings indicate that academics' primary motivations for AI adoption were the pursuit of efficiency and the aspiration to enhance pedagogy. However, the anticipated efficiency was often diminished by the need to verify AI outputs and by the limitations of available tools. Progression towards transformative use (Modification and Redefinition levels of SAMR) was influenced by an evolving pedagogical mindset, access to capable AI tools, and academic readiness. CoPs emerged as a vital support for initial experimentation but were often too informal and unstructured to systematically guide academics toward truly transformative practices.

CONCLUSIONS/RECOMMENDATIONS/SUMMARY

Theoretically, our study adds to a more holistic understanding of technology adoption. It shows how combining the UTAUT, TPACK, SAMR, and CoP frameworks creates a multidimensional view. Practically, findings from our study recommend that institutions foster an ecosystem that supports pedagogical innovation through curated, discipline-specific resources and stronger, more structured CoPs, moving beyond basic tool training.

KEYWORDS: AI adoption, academics' intentions and behaviours, Community of Practice, SAMR

Introduction

Artificial Intelligence (AI), particularly Generative AI (GenAI), is rapidly transforming how teaching and assessment are designed and delivered in higher education. From automating routine tasks to enabling personalised feedback and interactive content creation, these technologies are expanding the ways academics can engage students and enhance learning outcomes (Bhaskar et al., 2024). However, despite growing access to powerful AI tools, their use in university teaching often remains limited to basic enhancements rather than fostering deeper pedagogical transformation (Kohnke & Zou, 2025). While some academics experiment with AI to streamline tasks or supplement instruction, far fewer are leveraging these tools to fundamentally reimagine their teaching practices or assessment strategies (Belkina et al., 2025; Linden et al., 2025). This highlights the importance of understanding the motivations that drive AI adoption and the conditions that enable or constrain academics' progression toward more meaningful and transformative use, particularly as universities navigate the challenges and opportunities of GenAI adoption across diverse disciplines (Filiz et al., 2025).

Academics are at the centre of this technological shift. However, the journey from initial, often isolated, experimentation to sustained, transformative engagement is fraught with challenges. It requires not only individual technical competence but also pedagogical confidence and institutional support. While peer networks and Communities of Practice (CoPs) are recognised drivers of innovation (Bunt & Lautenbach, 2023), their specific role in helping academics overcome the initial hurdles of AI adoption to achieve deeper pedagogical change remains underexplored. The critical question is no longer if academics will use AI, but how they can be supported to move beyond simple enhancements toward genuine transformation. To address these gaps, we present our study which investigates how university academics, particularly those in Computing and Information Systems (CIS), adopt and engage with AI in their teaching. It draws on four complementary theoretical frameworks: Substitution, Augmentation, Modification, and Redefinition (SAMR) model (Puentedura, 2006), which categorises the depth of technology integration; the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), which explains adoption motivations through performance expectancy, effort, social influence, and support; Technological Pedagogical Content Knowledge (TPACK) (Mishra & Koehler, 2006), which highlights the interplay between technological, pedagogical, and content knowledge; and Community of Practice (CoP) (Wenger, 1998), which emphasises the role of peer collaboration and shared learning in shaping professional practice. To guide this investigation, the study is framed by the research questions:

1. RQ1: How do individual motivations (UTAUT), pedagogical readiness (TPACK), and social influence (CoP) interact to shape academics' adoption of AI in their teaching and assessment practices?
2. RQ2: What factors and support mechanisms enable or hinder academics' progression along the SAMR framework, moving from enhancement-level AI use (Substitution and Augmentation) to more transformative applications (Modification and Redefinition) in teaching and assessment?

Literature Review

Factors Affecting AI Adoption among Academics

Recent studies highlight key enablers and barriers to AI adoption in higher education, underscoring the need for institutional strategies that support effective integration. The theoretical frameworks, UTAUT, TPACK and CoP, provide valuable lenses for understanding these dynamics. Together, they clarify how individual, pedagogical, and contextual factors shape academics' adoption decisions and influence the meaningful use of AI in teaching and learning.

UTAUT identifies four determinants of technology adoption: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. Performance Expectancy, the belief that AI improves teaching through personalisation, efficiency, or creativity, drives adoption but is tempered by concerns about reliability, reduced student interaction, and academic integrity risks (Bhaskar et al., 2024). Effort Expectancy reflects the perceived ease of using AI tools, with adoption higher among confident users, particularly in computing disciplines (Ghimire et al., 2024). Social Influence stems from professional development and peer engagement, though the role of CoP remains underexplored (Al-Mughairi & Bhaskar, 2024). Facilitating Conditions, such as institutional resources, technical support, and clear policies encourage adoption, whereas gaps in infrastructure, privacy, and pedagogical guidance act as barriers (Al-Zahrani & Alasmari, 2024).

TPACK highlights how the interplay of Technological (TK), Pedagogical (PK), and Content knowledge (CK) shape academics' capacity to meaningfully integrate AI into teaching. Adoption of AI is more likely when academics can align AI tools with subject content and apply pedagogically sound strategies. For instance, academics who see AI as a means to enhance personalisation, student engagement, or assessment efficiency are more inclined to adopt these tools (Oved & Alt, 2025). However, this integration is challenging, particularly for those outside of technical disciplines (Lin & Chen, 2024). Barriers often arise from limitations in one or more components of TPACK. Academics may lack technological fluency (TK), making it difficult to explore or evaluate AI tools confidently, a concern that aligns with UTAUT's concept of effort expectancy. Others may struggle to find appropriate pedagogical approaches (PK) for using AI in ways that go beyond substitution, or to align AI-generated content with discipline-specific requirements (CK) (Oved & Alt, 2025).

The Spectrum of AI Use in Higher Education

SAMR is widely used to explore how emerging technologies like AI are integrated into education (Belkina et al., 2025; Linden et al., 2025). The model comprises four progressive levels: Substitution, Augmentation, Modification, and Redefinition, which represent a continuum from basic technology replacement to the transformation of learning through innovative, technology-driven practices. The first two levels of SAMR enhance traditional educational practices. At the Substitution level, technology performs the same task as before, for example, using GenAI to generate a standard quiz instead of writing it manually. At the Augmentation level, the task remains the same but is improved through functional enhancements; for instance, GenAI can provide instant, personalised feedback on a student's essay, improving upon the traditional delay in receiving teacher comments. In contrast, the next two levels transform learning experiences. Modification involves rethinking the task itself. Rather than simply writing a report, students might prompt GenAI to generate a draft and then critique it for bias, accuracy, or depth, redesigning the assignment around higher-order thinking and critical evaluation. Finally, Redefinition enables entirely new types of learning that were previously inconceivable. For example, students could collaborate with GenAI to co-design and run an interactive simulation of a historical event to test alternative decisions and analyse its corresponding consequences. With Redefinition, the academic acts as a learning facilitator, guiding students through complex, AI-mediated experiences that extend far beyond traditional classroom possibilities.

Recent literature shows that AI, particularly GenAI, is being used across the SAMR spectrum, though adoption remains uneven (Belkina et al., 2025; Linden et al., 2025). Most applications focus on enhancement, such as translation, answering student questions, simulating simple conversations, generating case study and rubric ideas, while transformative uses are less common. Emerging examples include using AI to foster critical thinking by critiquing AI-generated solutions or engaging students in role-playing with AI as an industry consultant. However, little is known about the factors that enable academics to move from enhancement to transformative use or the barriers preventing this shift (Belkina et al., 2025). Therefore, while UTAUT, TPACK, SAMR, and CoP provide useful frameworks for understanding AI adoption, a deeper understanding is needed to explain why use often remains at enhancement levels.

Research Methodology

This study used a collaborative autoethnography approach to examine how academics integrated AI, particularly GenAI, into teaching and assessment. Collaborative autoethnography involves researchers with a dual-role of also being participants by analysing their own experiences to gain insight into broader sociocultural phenomena (Goldsmith et al., 2023). This method enabled an in-depth exploration of participants' lived experiences, decision-making processes, and evolving perspectives, positioning them as both researchers and subjects. It provided a rich, reflective account of the complexities of AI adoption, offering insights that traditional third-person research methods may not capture. From this point forward, we will refer to ourselves as participants when discussing our responses within the study.

A purposive sample of eight education-focused academics from the CIS discipline at the University of Melbourne was selected to ensure a rich and relevant dataset. The participants represented diverse career stages, ranging from early-career Associate Lecturers to more senior academics, including Senior Lecturers and an Associate Professor. Their teaching experience spanned from four to over thirty years, with most holding roles that allocated 60-85% of their workload to teaching. While some were actively leading research on AI in education, others were planning future involvement in the area. Collectively, the group possessed strong technical expertise, enabling informed experimentation and critical reflection on the pedagogical use of AI. Most identified as early adopters of educational technologies, reported confidence levels of 7-9 out of 10 when using new tools, and were predominantly within the 25-54 age range, representing academics of different genders.

Data were collected using a structured questionnaire that included demographic items and 11 open-ended questions. The questions were organised around four themes: current practices, community and collaboration, knowledge and perceptions, and enhancement or transformation. They were explicitly aligned with the study's research questions and theoretical frameworks and they invited participants to reflect on their use of AI in teaching and assessment, their motivations and future intentions, the role of collegial and institutional support, perceived benefits and challenges, confidence in achieving learning outcomes, and the extent to which AI use enhanced or transformed their teaching. This reflective, question-guided approach provided structured yet personal narratives, forming the foundation for the collaborative autoethnographic analysis.

The collected reflections were analysed using thematic analysis (Braun & Clarke, 2022), following its six phases: familiarisation with the data, generation of initial codes, grouping codes into preliminary themes, reviewing and refining themes, defining and naming themes, and producing the final thematic map. Three coders undertook the analysis, each focusing on specific topic areas aligned with the study's theoretical lenses to ensure consistency. They met regularly to compare interpretations, resolve discrepancies, and refine a shared codebook as insights emerged.

The analysis was guided by four conceptual frameworks: UTAUT (motivations and acceptance factors), TPACK (integration of technological, pedagogical, and content knowledge), CoP (peer networks and institutional support), and SAMR (levels of AI integration from enhancement to transformation). This combined approach enabled a nuanced understanding of how and why academics engaged with AI and the conditions influencing their progression from enhancement to more transformative teaching practices.

The credibility of our findings is supported by the study's qualitative rigour. Our collaborative autoethnographic method encouraged continuous shared reflection, and researcher triangulation was applied during thematic analysis. Rather than pursuing statistical representativeness, as in quantitative research, this study seeks analytical generalisability, which is typical in interpretivist approaches (Goldsmith et al., 2023). By drawing on a purposive sample, we generated deep, contextual insights that offer a rich theoretical understanding of AI adoption, insights that can be transferred and tested in other academic contexts.

Research Findings

This study found that participants used a variety of AI tools to support teaching and assessment, with ChatGPT and a university-provided AI tool, Spark AI, most common. These tools helped generate and refine teaching materials and create more inclusive and multimodal learning, while specialised tools such as Turnitin's AI detection and GitHub Actions served discipline-specific needs. The findings also highlight motivations, barriers, and enabling conditions for AI adoption, and the factors that support progression from basic use to more transformative practices.

RQ1: Factors Shaping Academics' Adoption of AI

In response to our first research question, the findings show that initial AI adoption is driven by the interplay of individual motivation and the social influence of participants' CoPs.

The Drive for Efficiency and Quality Enhancement: A primary driver of AI adoption was the expectation of saving time and reducing routine workloads, aligning with the Effort Expectancy and Performance Expectancy of UTAUT. Participants consistently cited efficiency as a key motivator in their work patterns: "Efficiency, no other reason" (P2), efforts to "improve efficiency" (P1, P6), and the need to "save time and energy" (P5). In addition to savings, participants expected improvements in teaching quality, such as providing "tailored feedback" and clarifying "complex concepts" (P7). In practice, AI was used to streamline lesson preparation and content review by extracting key ideas from academic papers, drafting and summarising teaching resources, refining explanations, and generating new ideas (P4). Some viewed AI as a creative partner, useful for overcoming blocks when "stuck" and freeing up time for more valuable teaching tasks.

However, the expected efficiency benefits were not always realised. Many reported that verifying AI outputs for accuracy and bias often consumed considerable time, offsetting potential time savings. Furthermore, prompt engineering posed challenges, with initial AI responses frequently too generic and requiring significant refinement (P2). Technical limitations of university-supported tools, which lacked the features of commercial counterparts and AI's unreliable image or video generation, further restricted the benefits of AI and hindered experimentation with more advanced features, tempering the expected efficiency gains (P1).

The Aspiration for Enhanced Pedagogy: Beyond efficiency, many participants adopted AI with the aspiration of creating more engaging and personalised learning experiences, reflecting Performance Expectancy (UTAUT). For example, AI was used to adapt content to students' levels of understanding and language proficiency, supporting more inclusive pedagogy. Participants also saw AI as an opportunity to shift toward more student-centred TPACK applications. One participant described a goal to offer a "more personalised teaching experience" (P1), while another sought to help students "become more efficient and productive, but without becoming so reliant on it that they compromise their own learning" (P3). At its most advanced, AI was seen as a means to rethink educational design, such as through a "multi-agent simulation platform" that could "re-examine the very goals of education" (P6). Early applications included AI-supported interactive case studies, concept visualisations, and multimodal learning materials designed to foster engagement and provide opportunities for self-assessment and critical thinking, with one participant noting, "I see this as a way to foster critical thinking about AI while also enriching classroom engagement" (P4).

Despite these intentions, participants faced practical and pedagogical challenges. Some feared AI might promote shallow learning or act as a "crutch" rather than a learning aid, while others noted the lack of discipline-specific TPACK exemplars or proven models for AI-enhanced activities, limiting confidence to move beyond experimentation. This highlights the gap between recognising AI's potential and having the pedagogical knowledge to implement it effectively.

The Critical Role of Communities of Practice: CoPs were crucial for AI adoption, building confidence and fostering ethical dialogue. As one participant noted, “The community is an essential news channel for me to keep myself up to date regarding the current developments” (P1), while another shared, “I held off on using [AI] until I could discuss the ethics with [my colleagues] to ensure I wasn’t doing anything wrong” (P3). CoPs helped address some adoption challenges by showcasing AI teaching experiments and providing spaces for peer reflection. These exchanges inspired participants to explore new engagement strategies and “validating ideas as well as identifying potential risks” (P7). By offering real examples and peer feedback, CoPs supported a shift from abstract interest to concrete AI-supported teaching activities. These peer discussions encouraged experimentation and responsible use, reducing hesitation and supporting more effective integration of AI into teaching workflows.

Professional Identity and Career Progression in the AI Era: For many participants, AI adoption was also driven by professional identity and long-term career development. They felt a strong imperative to remain current in a rapidly evolving academic environment, recognising AI literacy as a capability likely to become integral to both teaching and research. Some used AI to deepen disciplinary expertise, such as by verifying complex concepts or improving the quality of software code for instructional and research purposes. AI also provided opportunities to engage with colleagues and institutional networks, reflecting the Social Influence construct of UTAUT. One participant described their motivation as a desire to “engage meaningfully with colleagues” and keep pace with emerging AI practices (P4). AI adoption was thus framed as a way to participate in broader conversations about educational innovation, digital skills, and future workforce demands.

However, turning this professional interest into sustained practice proved challenging. Participants noted a lack of structured pathways and pedagogical exemplars to transition from individual experimentation to recognised professional integration. While CoPs were valuable for networking and informal learning, they often lacked the support for structured and long-term capability building. One called for “practice-oriented use cases that better equip educators to move from experimentation to sustained pedagogical impact” (P6). Strengthening CoPs with curated resources and formal professional development pathways was viewed as essential to ensure AI adoption supports both immediate teaching innovation and longer-term professional growth.

Overall, participants saw AI as a way to streamline work, enrich learning, and build capability, but progress beyond early experimentation was uneven. While CoPs supported adoption, sustained transformative use requires clearer guidance, discipline-specific exemplars, and structured professional development.

RQ2: Factors Influencing the Progression to Transformative Use of AI

Addressing our second research question, the findings show that most participants reported AI use at the enhancement level of the SAMR framework, primarily focused on efficiency and incremental improvements. Progression toward transformative use (Modification and Redefinition) was shaped by evolving perceptions of AI’s role, access to advanced tools, supportive institutional and peer environments, academic readiness, and opportunities for experimentation.

Evolving Pedagogical Mindset: Some participants began to see AI as a potential driver of pedagogical change rather than merely a productivity aid. As one observed, “AI has the potential to offer benefits far beyond simple enhancements, with the power to transform learning and empower all students to learn more effectively” (P1). This mindset contrasted with others who still saw AI mainly as a time-saver: “I’m not doing anything fundamentally new; I’m just doing the same tasks better and faster” (P3).

Access to Capable Tools and Technology: Hands-on experimentation with advanced AI was a significant enabler of innovation. One participant noted, “I’ve had access to a range of AI tools, both commercial and university-supported, which has enabled practical experimentation” (P4). In contrast, outdated or restricted platforms hindered exploration and innovation: “Spark AI only provides access to older versions of AI models… These limitations significantly restrict our ability to experiment with new applications” (P1).

Nature of Institutional and Peer Support: Institutional support through seminars, CoPs, and faculty initiatives encouraged experimentation and knowledge-sharing. However, this support was often inconsistent and focused more on tool awareness than on pedagogical application. Participants called for “practice-oriented sessions that showcase real-world use cases” (P5) and a central “repository…to know who to contact or collaborate with if we are considering similar ideas” (P2).

Academic Readiness and Autonomy: An academic’s confidence, expertise, and freedom to innovate played a crucial role in their ability to progress. Those with prior expertise felt confident contributing to change: “Drawing on my knowledge of AI and my research in AI in education, I clearly see the possibilities it offers… I believe I have the ability to contribute to this transformation” (P1). Others felt underprepared: “I feel underprepared when it comes to the bigger picture… we are still in an experimental phase” (P3). The need for continual learning and uncertainty about best practices often slowed progress.

Opportunities for experimentation were critical. Academics with autonomy and time trialled new approaches, such as an ethics assignment requiring students to critique AI-generated responses: “Rather than presenting an ethical analysis solely from their own perspective, students were required to input their chosen scenario into ChatGPT, critically evaluate the AI-generated response, and assess its reasoning” (P4). By contrast, those with limited control over curriculum or constrained by time remained at the enhancement level: “Since I'm just a Level A academic staff, AI is generally useful for assisting me to meet my teaching goals. But for other goals, such as curriculum design, I haven't explored its ability yet” (P5).

In summary, progression to transformative practice required mindset shifts, supportive tools, institutional and peer backing, and freedom to experiment, yet CoPs focused mainly on awareness and enhancement, limiting deeper pedagogical change.

Discussion

Our findings reveal that the adoption of AI in higher education is a multifaceted process, shaped by a complex interplay of individual motivations, the collaborative dynamics of professional communities, and the broader institutional environment. Consistent with prior research, efficiency in teaching and learning practices emerged as a key motivator for initial engagement with AI (Bhaskar et al., 2024; Ghimire et al., 2024); however, the journey toward more transformative pedagogical applications proved nuanced and far from linear. Our discussion explores three key themes emerging from the findings: the paradox of efficiency, the critical but underdeveloped role of CoP, and the necessary evolution of pedagogical identity in the age of AI.

A significant theme is the paradox of efficiency. While academics are drawn to AI with the promise of reducing their workload and automating routine tasks, a key motivator aligned with UTAUT's effort and performance expectancies, the reality is often more complex. Participants discovered that the time saved through AI-generated content was frequently offset by the time required to verify its accuracy, refine generic outputs, and address potential biases, echoing concerns about reliability and academic integrity risks reported in the literature (Bhaskar et al., 2024). This paradox highlights a novel insight: the overall efficiency gain is frequently marginal at standard levels of enhancement adoption. It suggests that for AI to be truly effective, its use must mature beyond a simple tool for substitution and become integrated into a more sophisticated workflow that accounts for critical evaluation and refinement. This challenge is not merely technical but is deeply intertwined with the pedagogical knowledge (TPACK) required to effectively integrate AI into the curriculum (Lin & Chen, 2024; Oved & Alt, 2025). This is particularly salient in engineering education, where the need to rigorously verify the technical accuracy of AI-generated content can completely negate any perceived time savings.

The second theme is the critical but underdeveloped role of CoP. CoPs are essential for fostering initial AI adoption, providing a vital forum for sharing ideas, building confidence, and navigating the ethical grey areas of this new technology, corroborating the role of peer engagement and social influence highlighted by UTAUT (Al-Mughairi & Bhaskar, 2024). These communities act as crucial social infrastructures, motivating exploration and supporting early experimentation. However, our study also reveals that these CoPs are often informal and lack the structure needed to guide academics toward transformative practices. While effective at the enhancement stages of the SAMR model, they are less equipped to support the pedagogical redesign required for modification and redefinition (Belkina et al., 2025; Linden et al., 2025).

Finally, our findings point to the necessary evolution of the academic's pedagogical identity. The journey from enhancement to transformation is not just about adopting new tools but about a fundamental shift in how academics perceive their role. Those who progressed toward more transformative uses of AI began to see it less as a productivity aid and more as a partner in pedagogical innovation, aligning with the SAMR model's emphasis on modification and redefinition (Belkina et al., 2025). This shift involves moving from being the sole source of knowledge to becoming a facilitator of learning, guiding students in how to critically engage with AI. Achieving this requires deep integration of technological, pedagogical, and content knowledge (TPACK), as academics must design learning experiences that leverage AI to foster higher-order thinking (Lin & Chen, 2024; Oved & Alt, 2025). Ultimately, the evolution of pedagogical identity represents both the greatest challenge and the greatest opportunity for higher education, underscoring the need for supportive institutional contexts that enable academics to reimagine their teaching in the age of AI.

Conclusion

Our study examined how academics in CIS are adopting and integrating AI into teaching and assessment using UTAUT, TPACK, CoP, and SAMR as the theoretical frameworks. Motivations such as efficiency gains, improved feedback, and enhanced student engagement were balanced against barriers including verification workload, pedagogical uncertainty, and limited institutional infrastructure. Most adoption remained at the enhancement stage, with transformation emerging only when readiness, pedagogical insight, and community support aligned. Theoretically, the study advances understanding of technology adoption by showing how the combined frameworks provide a multidimensional perspective on motivations, knowledge requirements, integration levels, and the influence of social learning structures. These insights inform practical action, highlighting the need for institutions to move beyond basic tool training by cultivating structured CoPs, providing discipline-specific exemplars, and supporting pedagogical experimentation through professional development and recognition of innovation. Academics, in turn, should treat AI as a pedagogical partner by developing AI literacy, critically refining outputs, and designing authentic AI-integrated learning experiences that foster higher-order and collaborative skills.

We acknowledge several limitations. Our sample of eight CIS early adopters may not represent the wider academic community, particularly those from non-technical disciplines or resource-constrained institutions. In addition, reliance on self-reported reflections without direct classroom observation or student outcome data means the findings capture perceptions rather than validated pedagogical impact. These limitations point to future research opportunities, including extending inquiry across diverse disciplines and institutional contexts, using longitudinal designs to trace how AI adoption evolves over time, and incorporating classroom observation and student perspectives to enrich and validate insights into AI's transformative potential in higher education.

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