



Rethinking Student Assessment in the Era of AI-Assisted Learning

A Case of Higher Learning Institutions in Tanzania

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Keywords

AI assisted learning, student assessment, higher education, Tanzania

Abstract

The rapid integration of artificial intelligence (AI) technologies in higher education is transforming teaching, learning, and assessment practices. Generative AI systems, such as ChatGPT and Google Gemini, enable students to generate ideas, summarize academic materials, and refine written work, challenging the validity of conventional assessments designed to measure independent intellectual effort. Despite this potential, limited research has explored how assessment can be reconceptualized to accommodate AI-assisted learning while maintaining academic rigor. This study addresses the question, how student assessment can be aligned with AI-mediated learning in higher education. Guided by Extended Mind Theory, which conceptualizes cognition as distributed across human and technological agents, the study examined assessment in Tanzanian higher learning institutions. Using a qualitative multiple case study design, data were collected from 68 participants through interviews, focus groups, open-ended questionnaires and document reviews. Thematic analysis revealed that students integrate AI tools as cognitive extensions, enhancing understanding, argumentation and metacognitive reflection, while lecturers noted benefits alongside challenges in evaluating independent learning. Emerging approaches including oral presentations, reflective journals, project-based tasks and AI-transparent reporting were identified as effective. The findings underscore the need for AI-inclusive assessment frameworks emphasizing process, reflection and critical engagement.

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1. Introduction

The rapid advancement of artificial intelligence (AI) technologies is transforming many sectors of society, including education (Luckin et al., 2016; Zawacki-Richter et al., 2019). In higher education, AI-powered technologies are increasingly integrated into teaching and learning processes, enabling new forms of knowledge production, academic support, and personalized learning (Holmes et al., 2019). The emergence of generative AI systems such as ChatGPT and Google Gemini has further accelerated this transformation by providing students with tools capable of generating text, summarizing academic materials, explaining complex concepts, and supporting academic writing (Dwivedi et al., 2023; Kasneci et al., 2023). As a result, AI is becoming an important component of contemporary digital learning environments in universities and other higher learning institutions (Zawacki-Richter et al., 2019).

Recent studies suggest that students are increasingly using AI-based tools to assist with a wide range of academic tasks, including brainstorming ideas, editing assignments, conducting preliminary research and improving the clarity of written work (Kasneci et al., 2023; Cotton et al., 2024). These technologies can enhance learning efficiency, expand access to information and support students in developing new academic skills (Holmes et al., 2019). Within the broader field of Artificial Intelligence in Education, scholars have emphasized that AI has the potential to significantly enhance learning experiences by supporting personalized learning, adaptive feedback and collaborative knowledge construction (Luckin et al., 2016; Holmes et al., 2019).

Despite these opportunities, the growing use of AI tools in academic work has generated significant debates regarding their implications for student assessment (Cotton et al., 2024; Dwivedi et al., 2023). Traditional assessment practices in higher education have historically been designed to evaluate students' independent intellectual efforts and mastery of course content (Boud & Falchikov, 2007). Common assessment methods such as essays, written assignments and take-home projects assume that the submitted work primarily reflects the student's own reasoning and analytical ability. However, the ability of generative AI tools to produce high-quality academic content

has challenged this assumption and raised important questions about the validity and reliability of conventional assessment methods (Kasneci et al., 2023; Cotton et al., 2024).

Scholars have increasingly pointed out that the presence of AI technologies in the learning process requires educators to reconsider the ways in which student learning is evaluated (Holmes et al., 2019; Zawacki-Richter et al., 2019). Rather than viewing AI solely as a threat to academic integrity, some researchers argue that it should be recognized as a new learning tool that can support knowledge development when used responsibly (Dwivedi et al., 2023). From this perspective, the challenge facing higher education institutions is not simply how to detect AI-generated work but how to redesign assessment practices that reflect the realities of AI-assisted learning while maintaining the authenticity of student learning outcomes (Cotton et al., 2024).

As AI technologies continue to evolve and become more accessible to students, universities/training institutions are increasingly confronted with the need to adapt their teaching and assessment strategies (Kasneci et al., 2023). This shift requires educators and policymakers to rethink traditional assessment models and explore innovative approaches that acknowledge the role of AI in contemporary academic work (Holmes et al., 2019). Understanding how assessment can be redesigned to accommodate AI-assisted learning is therefore an important issue for the future of higher education (Dwivedi et al., 2023).

The rapid integration of artificial intelligence (AI) technologies into higher education has significantly transformed how students engage with academic work (Kasneci et al., 2023). Generative AI tools, such as ChatGPT, allow students to generate ideas, draft assignments, summarize academic literature, and refine their writing with minimal effort (Dwivedi et al., 2023). While these tools offer potential benefits for enhancing learning and productivity, their increasing use has raised concerns regarding the effectiveness of traditional assessment methods in accurately measuring student learning outcomes (Cotton et al., 2024).

Conventional assessment practices in higher learning institutions, including written assignments, essays, and take-home projects, were designed to evaluate students' independent intellectual effort (Boud & Falchikov, 2007). However, the capacity of AI systems to produce high-quality academic responses makes it challenging for educators to determine whether submitted work reflects genuine understanding or AI-generated output (Kasneci et al., 2023). Consequently, questions about academic integrity, authenticity of learning, and the reliability of assessment outcomes have become increasingly prominent in contemporary educational discourse (Cotton et al., 2024).

In response, many institutions have emphasized detecting or restricting AI use in academic work. However, such measures may not fully address the underlying changes in the learning environment, as students are likely to continue incorporating AI into their study processes (Dwivedi et al., 2023; Holmes et al., 2019). Despite recognition of AI-assisted learning, there remains limited research on how assessment systems can be redesigned to accommodate AI while maintaining academic standards and ensuring meaningful learning outcomes (Zawacki-Richter et al., 2019; Cotton et al., 2024). This gap highlights the need for studies that explore alternative assessment approaches capable of recognizing AI-supported learning while ensuring that students demonstrate genuine understanding, critical thinking, and higher-order cognitive skills (Kasneci et al., 2023).

Research Question

To examine how student assessment can be rethought in the era of AI-assisted learning in higher education and how student assessment can be aligned with AI-mediated learning in higher education.

2. Theoretical Framework

This study is guided by the Extended Mind Theory, originally proposed by Andy Clark and David Chalmers in 1998 (Clark & Chalmers, 1998). The theory challenges traditional views of cognition by suggesting that human thinking is not limited to processes occurring within the brain but can extend to external tools and technologies that support cognitive activities. According to this perspective, when individuals rely on technological systems to perform cognitive tasks such as remembering, reasoning or problem solving, those technologies effectively become part of the cognitive system itself (Clark & Chalmers, 1998; Clark, 2008).

In educational contexts, the Extended Mind Theory provides a useful framework for understanding how digital technologies support learning processes (Clark, 2008; Selwyn, 2016). Modern learning environments increasingly incorporate technological tools that assist students in organizing information, analyzing ideas and producing knowledge. When students interact with such technologies, the boundary between human cognition and technological assistance becomes increasingly blurred. Rather than replacing human thinking, these tools function as cognitive extensions that enhance students' ability to process information and construct knowledge (Clark, 2008).

The emergence of generative artificial intelligence technologies has further expanded the relevance of this theoretical perspective in education (Kasneci et al., 2023; Dwivedi et al., 2023). AI-powered systems such as ChatGPT and Google Gemini are capable of generating explanations, summarizing information, suggesting ideas and assisting with academic writing. These capabilities enable students to engage in complex intellectual tasks with the support of intelligent digital systems. Within the framework of the Extended Mind Theory, such AI systems can be understood as cognitive partners that extend students' intellectual capacities rather than simply functioning as external tools (Clark, 2008; Kasneci et al., 2023).

This theoretical perspective has important implications for how learning and assessment are conceptualized in higher education. Traditional assessment models are generally based on the assumption that students complete academic tasks independently and that submitted work represents the individual's unaided cognitive effort (Boud & Falchikov, 2007). However, if technological tools are considered legitimate extensions of human cognition, then the strict separation between individual intellectual effort and technological assistance becomes difficult to maintain (Clark, 2008). In AI-assisted learning environments, students often interact with digital systems as part of their thinking processes, using them to refine ideas, explore alternative perspectives and improve the clarity of their academic work (Kasneci et al., 2023).

From the perspective of the Extended Mind Theory, the presence of AI technologies in learning environments does not necessarily undermine student learning. Instead, it reflects the evolving nature of cognition in technologically mediated contexts (Clark, 2008; Selwyn, 2016). Consequently, educational practices, including assessment systems, may need to adapt to recognize how students interact with technological tools in the process of knowledge construction. Rather than focusing exclusively on detecting AI-generated content, educators may need to design assessment approaches that evaluate students' ability to critically engage with AI-generated information, integrate technological support into their learning processes and demonstrate meaningful understanding of academic concepts (Dwivedi et al., 2023).

By applying the Extended Mind Theory, this study seeks to conceptualize AI not merely as a source of academic misconduct but as a potential component of contemporary cognitive systems within higher education. This perspective provides a theoretical basis for rethinking student assessment practices in ways that acknowledge the role of AI in supporting learning while still ensuring that students demonstrate genuine intellectual engagement and critical thinking (Kasneci et al., 2023).

3. Methodology

This study adopted a qualitative research approach to explore how student assessment can be rethought in the era of AI-assisted learning in higher education. A qualitative approach was deemed appropriate for capturing the lived experiences, perceptions and practices of participants within their natural academic contexts (Creswell & Poth, 2018; Denzin & Lincoln, 2018). This approach enabled in-depth exploration of how students and educators engage with generative AI tools, such as ChatGPT and Google Gemini, during academic tasks and assessment processes, generating rich, context-specific insights into AI-assisted learning practices (Merriam & Tisdell, 2016).

A multiple case study design was employed, involving five higher learning institutions across three regions of Tanzania: Arusha, Dodoma, and Dar es Salaam. The institutions were purposively selected to reflect diverse academic programs, pedagogical approaches and institutional types, including two universities regulated by the Tanzania Commission for Universities and three training institutions under the National Council for Technical and Vocational Education and Training (NCTVET). This design facilitated cross-case comparison, enabling the study to identify both common patterns and contextual differences in how AI tools influence student learning and assessment (Stake, 2006; Yin, 2018).

The study population comprised lecturers and undergraduate students actively engaged in teaching, learning and assessment. Purposive sampling was applied to select participants with direct experience in AI-assisted learning and assessment processes (Creswell & Poth, 2018; Patton, 2015). A total of 68 participants were included: 25 lecturers (five per institution) and 60 students (12 per institution), representing programs where AI-supported academic activities were common. This dual perspective allowed for a comprehensive understanding of AI's role in shaping assessment practices.

Data were collected using semi-structured interviews with lecturers, focus group discussions with students, open-ended questionnaires to lecturers and students and institutional document review. Interviews and focus groups elicited detailed narratives regarding AI use, while documents provided triangulation by capturing formal policies, assessment guidelines and course structures (Bowen, 2009; Kvale & Brinkmann, 2015; Krueger & Casey, 2015). Open-ended questionnaires complemented these methods by enabling lecturers and students to elaborate on their experiences at their own pace, ensuring broad coverage across institutions.

The collected data were analyzed using thematic analysis, which involved iterative coding to identify patterns and synthesize overarching themes (Braun & Clarke, 2021; Saldaña, 2021). Analysis stages included data familiarization, open coding, theme development, integration with the Extended Mind Theory framework (Clark & Chalmers, 1998), and triangulation across data sources. This process allowed the study to critically interpret how AI functions as a cognitive extension in learning and assessment contexts, ensuring robust and theory informed findings.

Trustworthiness was ensured through credibility, dependability, confirmability and transferability strategies (Krueger & Casey, 2015). Credibility was enhanced via triangulation and member checking, dependability through an audit trail of methodological steps, confirmability through reflexive documentation and transferability by providing rich contextual descriptions.

Ethical considerations were strictly observed. Approval was obtained from relevant institutional authorities and participants provided informed consent. Confidentiality and anonymity were maintained through coded identifiers and participants were informed of their right to withdraw at any stage without consequences.

4. Findings and Discussion

Patterns of AI Use in Academic Work

The findings indicate that students are progressively integrating artificial intelligence tools into their academic activities, reflecting a sophisticated and strategic engagement with emerging technologies. Participants reported frequent use of generative AI systems such as ChatGPT and Google Gemini for assignment preparation, idea generation, summarization of academic materials and enhancing the clarity and structure of written work. Students emphasized that these tools provide immediate cognitive scaffolding, enabling them to clarify complex concepts, organize their thoughts and refine arguments during independent study. Several participants also highlighted AI's role in editing grammar and improving academic language, suggesting that these technologies are increasingly perceived as cognitive partners rather than mere informational resources.

Lecturers corroborated these observations, noting measurable improvements in the coherence, logic and organization of students' submissions. While some expressed concern regarding potential overreliance on AI, many acknowledged that AI supported tools have become an integral component of contemporary learning strategies, facilitating iterative refinement and deeper engagement with academic content. These findings align with prior empirical work highlighting AI's capacity to provide timely feedback, generate summaries and scaffold complex cognitive tasks, thereby enhancing student engagement and efficiency in knowledge construction (Holmes et al., 2019; Kasneci et al., 2023; Cotton et al., 2024).

From a theoretical perspective, this pattern of AI adoption resonates strongly with the Extended Mind Theory, which posits that cognition can extend beyond the biological mind to encompass tools and technologies that mediate thinking and reasoning (Clark & Chalmers, 1998; Clark, 2008). In this context, AI tools function as cognitive extensions, allowing students to externalize ideas, manipulate knowledge structures and scaffold higher-order thinking processes. The findings underscore that AI is not a passive

instrument but an active participant in intellectual workflows, effectively becoming embedded within students' cognitive ecosystems. This supports earlier assertions that interactions with AI systems blur the boundaries between human cognition and technological assistance, necessitating a reconceptualization of learning and assessment paradigms to accommodate mediated cognitive processes (Selwyn, 2016; Dwivedi et al., 2023).

Moreover, the study extends existing literature by highlighting the contextual nuance in AI integration. Beyond efficiency and task completion, students actively use AI to support higher-order cognitive functions such as synthesis, argumentation, and meta-cognitive reflection a dimension underexplored in previous research (Luckin et al., 2016; Holmes et al., 2019; Kasneci et al., 2023). This indicates that AI contributes not only to academic performance but also to the development of students' critical thinking and self-regulated learning capacities. At the same time, these findings challenge traditional assessment models, which assume independent intellectual effort as the primary marker of learning. As the Extended Mind framework suggests, outputs produced with AI assistance may still reflect authentic cognitive engagement, yet conventional assessment often fails to recognize mediated knowledge work (Clark, 2008; Boud & Falchikov, 2007). This underscores the urgent need for higher education institutions to reimagine assessment frameworks shifting from output-focused measures toward strategies that evaluate students' critical engagement with AI-generated content, synthesis abilities and conceptual understanding within technologically augmented learning environments (Dwivedi et al., 2023; Cotton et al., 2024).

Therefore, AI tools are increasingly embedded in students' academic practices, functioning as extensions of cognition that enhance idea generation, argument refinement, and conceptual clarity. These findings emphasize both the theoretical and practical imperative for assessment systems to acknowledge AI-assisted learning as an authentic and integral component of contemporary higher education.

Challenges Posed by AI to Traditional Assessment Practices

The findings reveal that the widespread integration of AI technologies in higher education poses profound challenges to conventional assessment practices. Lecturers consistently reported that traditional evaluation methods particularly essays, take home assignments and written projects may no longer reliably capture students' independent intellectual capabilities. Participants emphasized that generative AI systems, such as ChatGPT and Google Gemini, can produce academically coherent, well-structured and polished outputs, complicating efforts to discern whether submitted work reflects authentic student understanding or AI-mediated production (Kasneci et al., 2023; Cotton et al., 2024). This blurring of authorship raises critical questions about the validity of assessments designed under assumptions of independent cognitive labor.

These challenges are further exacerbated by the fact that existing academic integrity policies and assessment guidelines were developed prior to the proliferation of AI in higher education. Lecturers observed that current frameworks inadequately address the complexities introduced by AI-assisted learning, leaving them with limited tools to evaluate originality, authenticity and cognitive engagement. These observations resonate with prior studies suggesting that conventional assessments, which presume unmediated intellectual effort, may fail to capture meaningful learning outcomes in technologically augmented environments (Dwivedi et al., 2023; Holmes et al., 2019).

From the perspective of the Extended Mind Theory, these challenges reflect a fundamental transformation in the nature of cognition within AI-rich learning environments. As posited by Clark and Chalmers (1998) and Clark (2008), cognitive processes extend beyond the individual to incorporate tools and technologies that actively participate in reasoning, problem-solving and knowledge construction. In this context, AI systems are not passive instruments but cognitive partners, shaping how students conceptualize, structure and communicate knowledge. Consequently, assessment models predicated on purely independent intellectual production risk misrepresenting the distributed and technologically mediated character of contemporary student learning (Selwyn, 2016; Dwivedi et al., 2023).

The findings also underscore the limitations of traditional assessment approaches in evaluating higher-order cognitive skills. Boud and Falchikov (2007) argue that assessments focused on content reproduction inadequately capture critical thinking, synthesis and reflective reasoning. The present study extends this critique by showing that AI integration intensifies these limitations: students can generate academically credible outputs with minimal demonstration of the underlying cognitive processes that conventional assessments aim to measure (Kasneci et al., 2023; Cotton et al., 2024). Lecturers' reflections suggest an urgent need to re-conceptualize assessment reliability and validity, shifting from a narrow focus on originality toward frameworks that evaluate students' capacity to critically engage with AI-generated content, integrate knowledge coherently and demonstrate conceptual understanding (Dwivedi et al., 2023; Holmes et al., 2019).

Therefore, the study confirms that AI technologies challenge the assumptions underpinning traditional assessment models. Grounded in the Extended Mind framework, these challenges are not anomalies but natural consequences of cognition becoming distributed across human and technological agents. Addressing these challenges requires higher education institutions to rethink assessment strategies, emphasizing evaluation of critical engagement, synthesis and reflective learning in AI-supported academic contexts. Such re-conceptualization is essential to ensure that assessment remains both valid and meaningful in an era of technologically augmented cognition.

Students' Perceptions of AI as a Learning Support Tool

The findings indicate that students predominantly perceive AI technologies as supportive instruments that enhance engagement with academic content and facilitate more efficient completion of learning tasks. Participants reported that generative AI systems, including ChatGPT and Google Gemini, enable them to explore multiple explanations for complex concepts, access illustrative examples that clarify abstract theories and obtain near immediate feedback when tackling assignments. Many students emphasized that these tools help them overcome learning barriers, particularly when confronted with dense academic texts or unfamiliar disciplinary content (Kasneci et al., 2023; Dwivedi et al., 2023). This suggests that AI is experienced as an active scaffold for learning rather than a passive informational resource.

Critically, students acknowledged the need for evaluative engagement with AI-generated content. While AI can produce coherent, well-organized outputs, participants reported instances of inaccuracy, overgeneralization, or contextual misalignment. Consequently, students described actively scrutinizing AI outputs, integrating them selectively into their reasoning processes and cross verifying information through independent study. This reflective engagement indicates that students view AI as a complementary cognitive partner, supporting but not replacing their own intellectual efforts (Holmes et al., 2019; Cotton et al., 2024). Such judicious use exemplifies how learners maintain agency and critical oversight in AI-mediated academic tasks.

From a theoretical standpoint, these perceptions resonate with the Extended Mind Theory, which conceptualizes cognitive processes as extending beyond the biological mind to include tools that actively participate in reasoning and knowledge construction (Clark & Chalmers, 1998; Clark, 2008). In this context, AI technologies function as external cognitive supports that structure ideas, mediate access to information and provide iterative guidance. By integrating AI into their cognitive workflows, students can engage in more sophisticated learning strategies, enhancing argumentation, synthesis and reflective thinking in ways not possible through unaided cognition alone (Selwyn, 2016; Dwivedi et al., 2023).

Empirically, the findings extend prior literature on AI-assisted learning by highlighting the meta-cognitive dimension of student engagement. While previous studies emphasize AI's role in content generation and task efficiency (Luckin et al., 2016; Holmes et al., 2019), the current study demonstrates that students actively evaluate the reliability of AI outputs, exercising judgment and reflective reasoning. This suggests that AI's educational value is realized not merely through information provision but through its capacity to support critical reflection, problem-solving and knowledge integration (Kasneci et al., 2023; Cotton et al., 2024). Importantly, these findings challenge traditional assessment assumptions, which often regard tool assisted outputs as indicative of diminished independent learning. Within AI-mediated environments, assessment frameworks must recognize that cognitive performance can legitimately include collaboration with technological systems. Evaluations that capture students' ability to critically leverage AI,

synthesize information and appraise outputs are more likely to reflect authentic learning in contemporary higher education (Dwivedi et al., 2023; Holmes et al., 2019).

So the current study demonstrates that students generally regard AI technologies as constructive extensions of their cognitive processes. AI serves as a scaffold for understanding, reflection and the development of higher-order academic skills. These findings underscore the imperative for pedagogical and assessment practices that acknowledge AI-assisted cognition, ensuring that evaluation systems capture genuine intellectual engagement within digitally augmented learning environments.

Emerging Approaches for AI-Inclusive Assessment

The findings indicate that reimagining assessment in AI-mediated learning requires a paradigmatic shift from traditional, output-centric approaches toward interactive, process oriented and reflective evaluation methods. Participants emphasized the potential of strategies such as oral presentations, in-class assessments, project-based tasks and reflective assignments that compel students to articulate their reasoning and decision-making processes. These methods provide educators with richer insight into conceptual understanding, critical thinking and problem-solving capabilities, while accommodating AI as a cognitive scaffold rather than a substitute for intellectual effort (Dwivedi et al., 2023; Bearman et al., 2020).

Transparency in AI use emerged as a critical principle. Lecturers suggested that students should explicitly report how AI tools contributed to their assignments, including how generated outputs were evaluated, synthesized and refined. This approach reframes AI from a potential threat to academic integrity into an integral component of the learning process, fostering accountability, reflective practice and responsible technology engagement. Empirical studies corroborate this perspective, emphasizing that students' ability to critically integrate AI-generated content into original work is central to maintaining scholarly rigor (Dwivedi et al., 2023; Long & Magerko, 2020).

Theoretically, these emerging assessment practices align closely with the Extended Mind Theory, which conceptualizes cognition as distributed across human and technological agents (Clark & Chalmers, 1998; Clark, 2008). AI

tools, when recognized in assessment design, are not penalized but treated as extensions of cognitive capacity, enabling richer demonstrations of understanding. Oral, reflective and process-oriented assessments capture how students navigate, interpret and integrate AI-assisted knowledge, reflecting the distributed and interactive nature of contemporary learning (Selwyn, 2016; Kasneci et al., 2023). By making AI's role explicit, these assessments evaluate students' higher-order cognitive engagement rather than merely the correctness or originality of outputs.

Critically, AI-inclusive assessment addresses limitations inherent in traditional evaluation models, which assume independent cognition and often fail to measure complex, contextually mediated learning. Process focused assessments encourage students to demonstrate critical thinking, synthesis, creativity and ethical decision-making while situating AI as a functional learning partner (Cotton et al., 2024; Holmes et al., 2019; Luckin et al., 2016). Beyond being a corrective response to AI misuse, this shift represents a strategic pedagogical opportunity: it fosters metacognition, ethical engagement with technology and reflective learning practices. Assessment thus evolves from a static measure of memorization or content reproduction to a dynamic evaluation of students' ability to integrate external cognitive supports into authentic intellectual work (Kasneci et al., 2023; Dwivedi et al., 2023).

Therefore, the study positions AI-inclusive assessment as both a theoretical and practical imperative. Grounded in the Extended Mind framework, these strategies emphasize transparency, reflection and process oriented evaluation, acknowledging AI as an active participant in students' cognitive processes. By re-conceptualizing assessment to capture mediated learning, higher education institutions can achieve more valid, reliable and meaningful measures of student understanding in digitally augmented academic environments.

5. Conclusion

The integration of AI technologies into higher education is fundamentally reshaping the landscape of learning, cognition and assessment, challenging entrenched assumptions about independent intellectual effort. This study

demonstrates that AI is not merely a peripheral tool but a functional extension of students' cognitive processes, actively participating in knowledge construction, synthesis and communication. Such a transformation necessitates a reconceptualization of assessment paradigms, moving beyond output-focused measures toward approaches that capture distributed cognition, reflective engagement and critical interaction with technological supports.

Traditional assessment methods, which prioritize isolated intellectual effort, are increasingly misaligned with the realities of AI-mediated learning. This misalignment underscores the need for assessment frameworks that legitimately recognize AI as a cognitive partner, while simultaneously maintaining rigorous academic standards. Effective evaluation in AI-rich environments should therefore assess students' capacity to critically engage with AI outputs, synthesize information and demonstrate conceptual understanding and higher-order thinking skills. Failure to adapt assessment strategies risks misrepresenting student learning and underestimating the cognitive complexity involved in AI-supported academic work.

In response, higher education institutions are encouraged to adopt AI-inclusive assessment strategies that foreground transparency, reflective practice and process-oriented evaluation. Practical measures include oral examinations, project-based tasks, reflective journals and in-class assessments that require students to articulate their reasoning and describe how AI tools were employed to support their work. These approaches enable educators to evaluate both cognitive engagement and ethical, responsible use of AI, transforming assessment from a test of memorization into a measure of metacognition, critical thinking and technological literacy.

Ultimately, integrating AI-aware practices into assessment frameworks preserves academic integrity while fostering 21st-century competencies aligned with digitally mediated learning environments. By recognizing AI as an integral component of contemporary cognition, higher education institutions can ensure that evaluation is valid, reliable and meaningful, preparing students not only to excel academically but also to navigate complex, technology-enhanced professional and societal contexts. This study contributes to the theoretical and practical discourse on AI in education,

providing a foundation for policies and pedagogical innovations that align assessment with the evolving realities of AI-assisted learning.

Future studies may further explore how emerging AI-inclusive assessment approaches can be effectively implemented and managed in large classes within higher education institutions. Given that many universities and training institutions operate with high student-lecturer ratios, further research is needed to identify practical strategies, technological support mechanisms and institutional frameworks that enable lecturers to apply reflective, process-oriented and AI-aware assessment models while maintaining reliability, fairness and academic rigor.

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7. Short biography

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