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Artificial Intelligence in Higher Education Assessment: Opportunities, Challenges and Pedagogical Considerations

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Abstract:

Artificial Intelligence (AI) has permeated the domain of education, particularly in student assessment within Higher Education Institutions (HEIs). This study systematically reviews existing literature to investigate the use of AI in HEI assessments, focusing on the opportunities, challenges, and pedagogical considerations. For this purpose, a search was carried out in the Scopus database. The study is based on PRISMA, and 20 papers were analysed. The review indicates that AI improves efficiency and personalisation in assessments through adaptive feedback systems and automated grading. However, ethical concerns related to algorithmic bias, the privacy of students' sensitive data, and limited pedagogical misalignment present significant barriers. The findings suggest that institutions should invest in educator training and provide guidelines for ethical use of AI to address data privacy and fairness concerns. The results highlight the metamorphic potential of AI in education while providing a roadmap for addressing its limitations and advancing future research.

Keywords:

Artificial Intelligence (AI), Higher Education Institutions (HEIs), Assessment, Pedagogy, Automated Grading

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Introduction

Artificial intelligence (AI) has become a fundamental element in the transformation of higher education institutions (HEIs), reshaping learning, teaching, and administrative processes. AI, defined as the imitation of human intelligence by machines to perform everyday tasks such as problem-solving, learning, and decision-making, goes beyond mere automation within HEIs to include personalised learning and data-driven educational strategies (Jiang, Li, Luo, Yin & Kaynak, 2022; Elikia & Rajamohan, 2024). In the realm of student assessment, AI offers innovative solutions for managing large-scale assessments, automating grading, and providing adaptive feedback, effectively addressing the growing demands of a diverse and expanding student population (Soe, Tang, Roll, Fels & Yoon, 2021; Hasan, 2022). These applications demonstrate AI's capability to enhance efficiency and promote student-centred educational approaches.

However, the incorporation of AI in HEI student assessments, presents several challenges. While previous research highlights the technical capabilities of AI tools, there is a notable lack of focus on their alignment with pedagogical frameworks and ethical principles, especially in the context of developing higher-order cognitive skills (Moorhouse, Yeo & Wan, 2023). A significant concern is the over-dependence on AI for student assessment, which can inadvertently diminish the creative and critical thinking that educators apply when designing and delivering assessments (Zhai, Wibowo & Li, 2024). When teachers rely heavily on AI to automate assessment processes, they may miss opportunities to create transformative and engaging tasks that challenge students' intellectual abilities. Furthermore, AI-driven assessment tools may not effectively evaluate students' critical thinking skills if they are not designed to assess high-level cognitive skills, such as analysis, evaluation, and creativity, as outlined in Bloom's Taxonomy (Kizilcec, Huber, Papanastasiou, Cram, Makridis, Smolansky, Zeivots & Raduescu,2024). This misalignment raises concerns about the role of AI in fostering the essential skills needed for academic and professional success.

Previous studies indicate that numerous AI-based assessment systems prioritise operational efficiency over educational objectives, often overlooking important theories such as Bloom's Taxonomy and constructivist learning approaches (Rodrigues, Pereira, Cabral, Gasevic, Ramalho & Mello, 2024). Furthermore, ethical issues, including data privacy, algorithmic bias, and the lack of transparency in AI decision-making processes, complicate its adoption (Murikah, Nthenge & Musyoka, 2024). These challenges highlight a critical gap in the literature, which has largely neglected the interplay between AI's technical potential and its pedagogical and ethical dimensions.

This study aims to address existing gaps by exploring the following research question: How can AI-driven assessment tools be effectively incorporated into HEIs to improve pedagogical outcomes while addressing ethical concerns and mitigating algorithmic bias? To answer this question, the study adopts

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a systematic review approach guided by the PRISMA framework, analysing literature from 2020 to 2024. By synthesising findings on the opportunities, challenges, and pedagogical implications of AI in HEI assessments, this study seeks to provide actionable insights for educators, technologists, and policymakers. The significance of this research lies in its interdisciplinary perspective, which bridges the technical innovations of AI with established educational theories and ethical considerations. In doing so, it highlights the need for AI tools that not only streamline assessment processes but also foster critical thinking, equity, and meaningful learning experiences. Through this lens, the study contributes to the evolving discourse on the role of AI in modernising higher education while ensuring alignment with the core principles of teaching and learning.

Key Concepts and Definitions

Role of AI in Student Assessment

AI is increasingly being used in HEIs to enhance assessment procedures, providing flexible feedback and automated grading systems (Klyshbekova & Abbott, 2024). Previous research on the role of AI in HEIs has shown that it can improve the learning process, increase student engagement, and enhance communication between teachers and learners (Bond et al., 2020; Akour & Alenezi, 2022). These capabilities significantly reduce educators' administrative workload, allowing them to focus more on academic engagement. Hooda, Rana, Dahiya, Rizwan, and Hossain (2022) argue that AI-driven grading systems, such as automated assignment grading systems, achieve consistent scoring, which enhances efficiency compared to traditional manual processes. This improvement in effectiveness provides teachers with more time to concentrate on teaching methods and core curriculum development. The next section discusses the opportunities presented by AI in higher education assessment.

Opportunities of AI in Higher Education Assessment

AI presents transformative opportunities for higher education institutions (HEIs) by enhancing scalability, personalisation, and feedback methods (Castro, Chiappe, Rodriguez & Sepulveda, 2024). Automated marking systems significantly expedite the assessment of assignments, particularly for large groups of students, thereby addressing the increasing demand for scalable education solutions. Katsamakas, Palov, and Saklad (2024) found that AI-automated programmes reduced grading time by 50% while also supporting accuracy, highlighting AI's potential to enhance organisational efficiency. Additionally, tools like adaptive quizzes provide personalised feedback, facilitating tailored learning pathways that cater to individual student needs (Ingkavara, Panjaburee, Srisawasdi & Sajjapanroji, 2022). These innovations not only modernise assessments but also enrich learning experiences by responding to the diverse needs of students.

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Nevertheless, the absence of pedagogical integration limits the full realisation of these opportunities. AI-powered approaches often struggle to incorporate established educational frameworks such as Bloom's Taxonomy, which emphasises structured learning objectives, or constructivist theories, which focus on active and contextualised learning (Yue, Jong, & Dai, 2022). Without these pedagogical foundations, AI systems risk offering only superficial benefits rather than fostering deep, meaningful learning experiences. Addressing this limitation could enhance the transformative potential of AI in higher education assessments, ensuring alignment with broader educational objectives.

Challenges of AI in Higher Education Assessment

Despite its benefits, the application of AI in higher education institution assessments is hindered by ethical concerns, algorithmic bias, and insufficient pedagogical alignment. Ethical issues, particularly those related to data privacy and security, are paramount. Sensitive and confidential student information managed by AI tools may be vulnerable to misuse or breaches, as noted by Katsamakas et al. (2024). Additionally, algorithmic bias poses significant challenges, as biased training data can perpetuate imbalances, disadvantaging certain student groups (Gonzalez-Calatayud, Prendes-Espinosa, & Roig-Vila, 2021). These issues necessitate a critical evaluation of AI algorithms to address unintended consequences and promote educational equity.

Another key issue is the limited integration of AI systems into existing pedagogical frameworks. Research by Yue et al. (2022) shows that most AI-powered assessment tools prioritise automation over alignment with educational theory. This lack of integration diminishes their effectiveness in fostering critical thinking and problem-solving skills, which are emphasised in frameworks like Bloom's Taxonomy. Zhai, Wibowo, and Li (2024) argue that many AI tools focus primarily on tasks such as automated marking of multiple-choice questions, overlooking complex cognitive skills like analysis and evaluation. This narrow focus risks promoting rote memorisation instead of encouraging holistic cognitive development. Critics further argue that an over-reliance on AI-powered feedback can undermine students' critical-thinking abilities, as students may prioritise improving grades at the expense of achieving conceptual understanding, ultimately compromising constructivist learning philosophies (Malik et al., 2023).

Research Gaps and Emerging Trends

Prior research highlights significant gaps in the alignment of AI-based assessment systems with pedagogical frameworks and their ethical implications. While technical efficiency has been thoroughly investigated, there are fewer studies that focus on the educational and ethical aspects of AI in assessments. For instance, Lee et al. (2021) discovered that only 15% of the studies reviewed examined

how AI tools correspond with structured educational objectives. This gap emphasises the urgent need for research that connects technical innovation with pedagogical and ethical considerations.

Emerging trends indicate a growing focus on addressing educational gaps, particularly through personalised learning and adaptive assessment tools. AI's capacity to deliver tailored feedback and support individualised learning paths holds significant promise for improving student engagement and outcomes. However, it is essential to integrate established educational theories, such as Bloom's Taxonomy and constructivist approaches, to fully realise the potential of these tools. By incorporating these frameworks, future research can direct the development of AI-driven assessments that align with comprehensive educational goals, thereby ensuring equitable and meaningful learning experiences.

AI has the potential to transform and modernise student assessment in higher education by improving efficiency, scalability, and personalization. However, significant challenges such as ethical concerns, algorithmic bias, and insufficient pedagogical integration limit its effectiveness and have not been adequately addressed in research. To overcome these issues, it is essential to conduct thorough research and integrate established educational frameworks. By addressing these gaps, AI can realise its promise as a transformative and innovative system for unbiased and meaningful assessment practices, ultimately enhancing the quality of education in HEIs.

Method and Data

The study employs a Systematic Literature Review (SLR) methodology to explore previous research on the opportunities, challenges, and strategies for integrating AI-powered assessment practices in HEIs. SLR is a replicable scientific process that utilises criteria-based analysis and selection of published studies, allowing for an evidence-based summary of research (Tavares, Azevedo, Marques & Bastos, 2023). This approach fosters a rigorous and transparent synthesis of existing research, ensuring the identification of trends and research gaps (Xiao & Watson, 2019; Mengiist, Soromessa & Legese, 2020; Madwe, Oluka & Mmatli, 2025). On December 18, 2024, a comprehensive online search was conducted using the Scopus database. The Scopus database was chosen as the primary source for retrieving relevant studies due to its multidisciplinary scope and high-quality coverage of peer-reviewed journals (Tavares, Azevedo, Marques & Bastos, 2023).

The research adopted the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework 2020, which provides a replicable and systematic approach for selecting, screening, and synthesising literature. By applying PRISMA, the research adheres to the highest standards of evidence-based research and transparency (Page et al., 2021).

The systematic reviews focus on peer-reviewed journal articles published between 2020 and 2024, coinciding with significant technological advancements and policy developments in AI. This timeframe

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ensures the inclusion of the most recent and pertinent studies. Additionally, limiting the search to English-language articles enhances clarity and accessibility in interpretations. Peer-reviewed journal articles were chosen to uphold the credibility and quality of the information.

The study utilised the SPIDER framework (Sample, Phenomenon of Interest, Design, Evaluation, and Research Type) to structure the review comprehensively and systematically.

Element	**Description**
S - Sample	Peer-reviewed journal articles published between 2020-2024 that focuses on AI in education. Particularly HEIs assessments.
PI – Phenomenon of Interest	Integration of AI-powered assessment practices in HEIs, emphasising opportunities, challenges and solutions.
D - Design	Systematic reviews and empirical studies adopting quantitative, qualitative or mixed methods.
E- Evaluation	Analysis of outcomes, including benefits, barriers and strategies for addressing challenges in AI assessments.
R – Research Type	Systematic review and empirical research.

Table 1: The SPIDER Framework
(Source: Adapted from Methley, Campbell, Chew-Graham, McNally and Cheraghi-Sohi (2014))

The Table 2 illustrates the inclusion and exclusion criteria that guided the selection of journal articles included in this study.

Inclusion Criteria	**Exclusion Criteria**
Published between 2020 and 2024.	Published before 2020 or after 2024.
English language.	Not in English.
Empirical research or relevant systematic reviews.	Opinion pieces, editorials, or unrelated reviews.
Peer-reviewed journal articles.	Not published in peer-reviewed journals.
Focus on use of AI in HEIs assessments, focusing on the opportunities and challenges.	No mention of AI in HEIs assessments, opportunities, challenges, and strategies to

	address barriers to AI adoption in HIEs assessments practices.

Table 2: Inclusion and Exclusion Criteria

After the inclusion selection process was carried out, based on pre-determined criteria, the main results of the selected works were codified and extracted to synthesise and provide an answer to the research question.

The study aimed to uncover how AI contributes to the transformation of assessment methods while enforcing critical thinking and mitigating challenges, such as algorithmic bias and ethical concerns. In alignment with these goals, the following research questions were formulated.

1. What opportunities does AI offer in improving assessment practices in HEIs?
2. What challenges deter the effective application of AI-powered assessment methods in HEIs?
3. What strategies can be employed to mitigate the challenges associated with infusing AI into assessment methods in HEIs?

Search Strategy and Data sources

The research strategy to identify relevant literature to answer the research questions involved conducting a search using the Scopus database. In the Scopus database, the search was based on the following terms between 2020 and 2024, including articles, abstracts, and keywords, in the subject area “AI, HEI & assessments, opportunities, challenges, and solutions.” The Boolean operators were used in the two databases were:

Scopus: (TITLE-ABS-KEY (**"artificial intelligence"** AND **"higher education**”) OR TITLE-ABS-KEY **("AI"** AND **"student assessment**”) OR TITLE-ABS-KEY (**"AI"** AND **"opportunities”) OR** TITLE-ABS-KEY (**"AI"** AND **"challenges**”) OR TITLE-ABS-KEY (**"AI"** AND **"solutions").**

Study Selection

The papers were assessed and selected according to the criteria set out in Table 2. The titles and abstracts were assessed independently, and once selected, the articles were analysed in full. The initial selection of papers based on the keywords provided above, resulting in a total of 2,220 articles. Adopting the PRISMA statement 2020, the selection was refined using criteria included in Table 1, resulting in a total of 284 papers for screening, as depicted in Figure 1.

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Results and Analysis of Findings

A total of 2,220 articles were identified through a systematic search conducted using the Scopus database. During this process, 1,936 were excluded for not meeting the inclusion criteria. The full text of the remaining 284 articles was reviewed, resulting in the further exclusion of 204 for non-compliance with criteria and an additional 25 due to inaccessible full texts. The article section and screening workflow are shown in Figure 1 below.

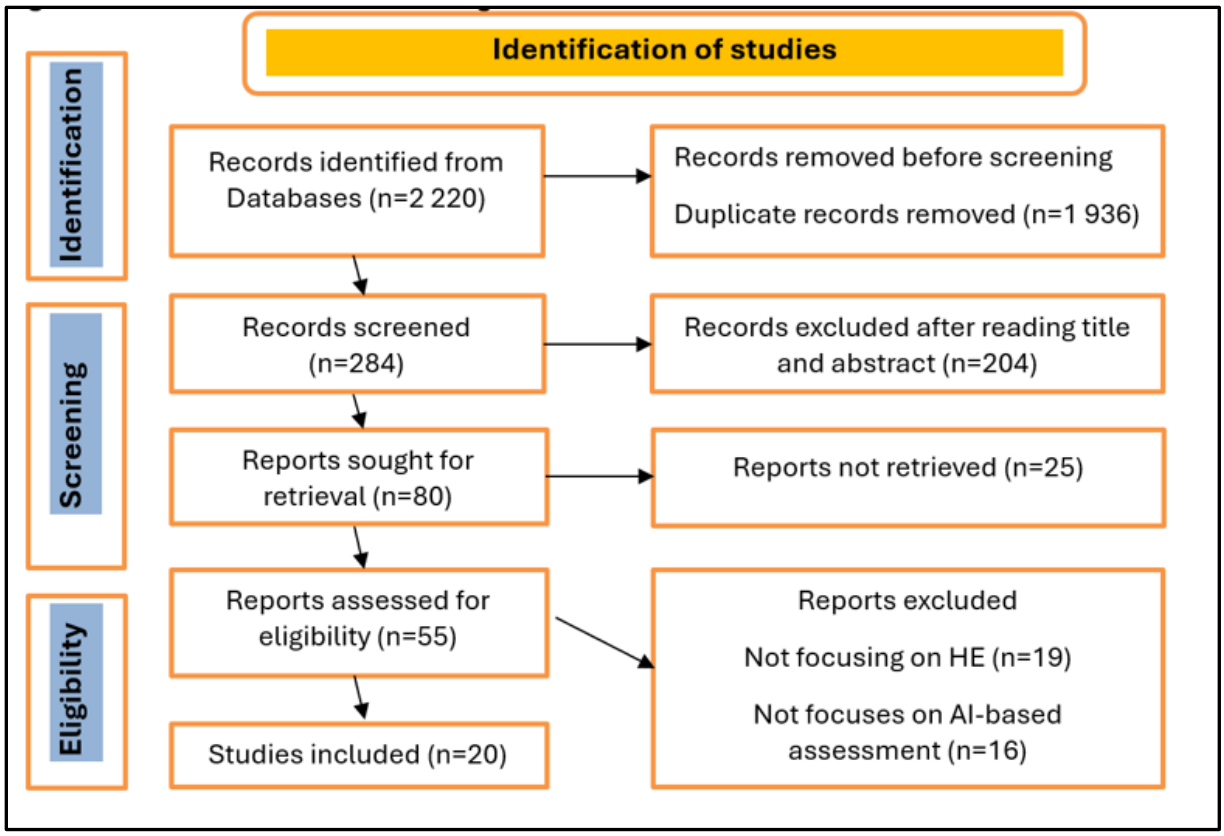

Figure 1: PRISMA Statement 2020 diagram

Results

No on the list	Authors and Year	Journal	Country	country Type	Continent	Research focus	Citations
3	Khandakar, H, Fazal, S. A., & Afnana, K. F., & Hasan, K. K. (2024)	IAES International Journal of Artificial Intelligence, 13 (4)	Bangladesh	Developing	Asia	AI in HEIs	0

7	Baidoo-Anu, D., Asamoah, D., Amoako, I., & Mahama, I. (2024)	Discover Education	Ghana	Developing	Africa	Use of ChatGPT on student learning	1
28	Hadzhikoleva, H., Rachovski, T., Ivanov, I., Hadzhikolev, E., & Demitrov, G. (2024)	Appl. Sci. 2024, 14 (19)	Balgaria	Developing	Europe	Using ChatGPT for Test creation	0
30	Imran, M., Almusharraf, N., Abdellatif, M. S., Abbasova, M. Y. (2024)	International Journal of Interactive Mobile Technology, 18 (18)	Saudi Arabia, Azerbaijan, Egypt	Developing countries	Asia, Asia-Europe and Africa	AI-assisted assessment and feedback	0
37	Romos, B., & Condotta, R. (2024)	Journal of Chemical Education, 101(8)	Brazil	Developing	South America	Using AI as a catalyst to create engaging problem-based learning scenarios	0
38	Bitar, N., & Davodovich, N. (2024)	Education Sciences, 14 (8)	Israel	Developed	Asia	Pedagogical innovation	0
43	Kallunki, V., Kinnunen, P., Pyorala, E., Haarala-Muhonen, A., Katajavuori, N., & Myyry, L. (2024)	Education Sciences, 14 (7)	Findland	Developing	Europe	AI in teaching and learning	0
59	Castro, G. P. B., Chiappe, A., Rodriguez, D. F. B., & Sepulveda, F. G. (2024)	Electronic Journal of e-Learning, 22 (5)	Colombia, Chile	Developing	South America	AI-HEIs assessment	2
60	Jose, J., & Jose, J. B. (2024)	The Electronic Journal of e-Learning, 22 (2),59-77	The Sultanate of Oman	Developed	Asia	Opportunities and challenges of AI in HEIS	2

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61	Alrayes, A., Henari, T. F., & Ahmed, D. A. (2024)	Electronic Journal of e- Learning, 22 (2)	Bahrain	Developing	Asia	ChatGPT in education	1
62	Klyshbekova, M., Abbott, P. (2024)	Electronic Journal of e-Learning, 22 (2)	UK	Developed	Europe	Chat GPT and assessment in HE	2
65	Rudolph, J., Ismail, F. B.M., & Popenici, S. (2024)	Journal of University & Learning Practice, 21(6)	Singapore and Australia	Developed	Asia and Oceania	HE's generative AI	20
96	Ateeq, A., Alzoraiki, M., Milhem, M., & Ateeq, R. A. (2024)	Frontiers in Education. 9 (2024)	Bahrain	Developing	Asia	AI and comprehensive assessment approaches	0
111	Akharbi, W. (2024)	International Journal of Computer-Assisted Language Learning and Teaching, 14 (1)	Saudi Arabia	Developing	Asia	AI adoption within HE	1
140	Shamsuddinova, S., Heryani, P., Naval, M. A. (2024)	International Journal of Educational Research, 25	UK and United Arab Emirates	Developed	Europe and Asia	AI in teaching and learning	2
164	Al-Maawali, W., Rushaidi, I.A. (2023)	Ubiquitous Learning: An International Journal, 17 (1)	Oman	Developing	Asia	Technology for reliable online testing	0
172	Naidu, K., & Sevnarayan, K. (2023)	Online Journal of Communication and Media Technology, 13 (3)	South Africa	Developing	Africa	ChatGPT on online assessment	36
188	Shanto, S. S., Ahmed, Z., & Jony, A. I. (2023)	STEM Education, 3 (4)	Bangladesh	Developing	Asia	AI-assessment integrity	6

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189	Gallent-Torres, C., Zapata-Gonzalez, A., & Ortego-Hernando, J. L. (2023)	RELIEVE – Revista Electronica de Investogacion y Evaluacion Educativa, 29 (2)	Spain & Mexico	Developed and Developing	Europe & North America	AI-ethics	7
202	Kohnke, L., Moorhouse, B. L., & Zou, D. (2023)	Computers and Education: Artificial Intelligence, 5 (2023)	China	Developing	Asia	AI & university instructors	67

Table 3: Selected studies on the opportunities, challenges associated with AI applications in HEIs assessments, and solutions

Table 3 shows the information about the reviewed studies. Table 3 indicates key trends in the application of AI-based assessments in higher education institutions (HEIs), with a focus on opportunities, challenges, and solutions. A remarkable observation is the domination of Asia in this space of research, as shown by eight (8) articles from nations such as Bangladesh, Saudi Arabia, Oman and Bahrain. These contributions reveal Asia's proactive engagement in using AI-driven assessments in HEIs. For example, Ateeq et al. (2024) in Bahrain studied AI's role in comprehensive assessment approaches, while Kohnke, Moorhouse and Zou (2023) from China focused on how HEI teachers interact with AI, earning significant attention with 67 citations. In comparison, contributions from Europe are also significant but somewhat less frequent, with studies from Bulgaria, Spain, and the UK, such as Shamsuddinova et al. (2024), which explored AI in teaching and learning. Africa and South America are underrepresented, with only one or two contributions each, such as Naidu and Sevnarayan (2023) from South Africa and Romos and Condotta (2024) from Brazil. The non-appearance of North America in this review is specifically noticeable and advocates either a lack of inclusion or a gap in AI research focused on AI-driven assessment in this region.

Table 3 also highlights varying levels of impact within the academic community. Highly focused and specialised journals such as the Electronic Journal of e-Learning and Education Sciences appear as essential platforms for disseminating research in this area. Papers published in these journals, such as Alrayes et al. (2024) on ChatGPT AI application with implications for learning outcomes, are noteworthy. Nonetheless, citations highlight a significant disparity: earlier research, like Naidu and Sevbarayan (2023), obtained 36 citations, showing their broader academic impact. Conversely, recent research from 2024, such as Imran et al. (2024) and Rudolph et al. (2024), has zero or low citations, probably due to their recent publication and limited time for academic uptake.

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In terms of geographical representation, Table 3 indicates a substantial gap. Africa and South America, regions that could benefit considerably from AI-based innovation in HEIs, are underrepresented. For instance, Naidu and Sevnarayan (2023) from South Africa is one of the few researchers tackling online assessment using ChatGPT, yet there remains a lack of broader engagement with AI-powered solutions designed for the challenges faced by higher education in developing countries. This gap highlights the need for localised studies that consider context-specific challenges, such as infrastructure limitations and digital literacy gaps.

Table 3 shows a global interest in AI-based assessments in HEIs but also reveals uneven research distribution, with Asia and Europe leading the space. Addressing these gaps through collaborative and interdisciplinary studies could enhance a more impartial and impactful incorporation of AI into HEI assessments worldwide.

Opportunities Identified

The study indicates substantial opportunities for adopting AI-based assessment to improve student assessment methods in higher education institutions (HEIs). One primary opportunity is the capability for **improved formative evaluation**. AI-driven tools analyse large volumes of learner performance information to generate individualised feedback, allowing students to recognise their strengths and weaknesses (Imran et al., 2024; Kallunki et al., 2024). This feedback advances an immersed understanding of course material and sustains active engagement, enabling more efficient learning outcomes.

Another significant opportunity is the effectiveness afforded by **automated grading systems**, which save time and enhance the reliability and accuracy of assessments. Twabu and Nakene-Mginqi (2024) highlight how AI can handle large-scale assessments effectively, enabling teachers to pay more attention to refining and improving instructional tactics and enhancing teaching quality.

AI also promotes **adaptive learning**, leveraging real-time data to offer personalised learning resources that comply with the distinct needs of students. For instance, platforms explained by Castro et al. (2024) vigorously accommodate individual student performance, improving interaction, engagement, and outcomes, especially in diverse and mounting student populations. In problem-based learning (PBL) contexts, AI has shown its benefit in connecting theoretical knowledge with practical application. Ramos and Condotta (2024) underscore the application of AI-driven assessment in chemical engineering education to foster problem-solving skills, supporting constructivist principles.

Nonetheless, prior research stresses that the success of these AI-based assessments is contingent on their alignment with recognised pedagogical frameworks such as Bloom's Taxonomy. For example,

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Stanka et al. (2024) advocate that integrating such frameworks into AI tools can improve their capacity to target specialised intellectual and cognitive skills, from basic recall to critical thinking.

Challenges Identified

The adoption and implementation of AI-driven tools in HEI assessments also offers numerous present several challenges. **Ethical concerns**, particularly regarding data privacy and algorithmic bias, serve as significant obstacles. Kallunki et al. (2024) and Alrayes et al. (2024) underscore the risks of unauthorised and illegal access to sensitive student information, as well as the potential misuse of such data. These issues contribute to hesitancy among educators, who are uncertain about how data protection and fairness are maintained in AI tools.

Moreover, algorithmic bias exacerbates inequalities in education, disproportionately marginalising overlooked demographic and linguistic groups (Heinke et al., 2024). In the absence of regular audits and diverse datasets during AI skill development, these biases can perpetuate systemic disparities.

Technical challenges arise from the insufficient integration of pedagogical theories into AI-driven tools. Many approaches, primarily developed by technologists, struggle to align with foundational frameworks like Bloom's Taxonomy or constructivist methods. This disconnect diminishes their ability to foster higher-order cognitive skills and meaningful learning experiences (Santo et al., 2023). Additionally, educator readiness and preparedness represent another concern, as some educators lack the necessary training and resources to effectively utilise AI tools (Jose & Jose, 2024). This lack of preparedness may result in an over-reliance on AI, which can overshadow essential pedagogical principles such as creativity and critical thinking.

Pedagogical Insights

The review highlights a gap in the integration of structured learning theories into AI assessment tools. Studies that incorporate pedagogical supports emphasise the significance of aligning AI systems with learning outcomes and teaching strategies. For instance, integrating Bloom's Taxonomy into AI-driven assessments can help develop specific cognitive skills, ranging from knowledge recall to higher-order thinking (Stanka et al., 2020; Borisova et al., 2023). However, these approaches are still underutilised. Additionally, constructivist methods, which promote active and contextualised learning, have received little attention, further limiting the educational impact of AI tools. This gap diminishes the ability of AI systems to cultivate deep and application-oriented learning experiences.

Ateeq et al. (2024) underscores the necessity of shifting assessment methods from traditional knowledge-based approaches to application-centric strategies that encourage creativity and critical thinking. Frameworks that introduce complexity into assessment tasks, as proposed by Al-Maawali and Rushaidi (2023), offer a balanced approach that aligns AI capabilities with pedagogical objectives.

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Strategies to Address Challenges

To address the identified challenges and issue identified, HEIs must prioritise the development and establishment of clear and transparent policies regarding data usage, privacy, and the ethical integration of AI tools. Transparent algorithms and robust data protection mechanisms are essential for fostering trust among students and teachers, ensuring accountability and fairness in assessment methods (Maheshwari, 2024). To reduce algorithmic bias, technologists and developers should utilise diverse datasets during AI training and conduct regular audits to identify and rectify biases. Involving teachers in the design process can further ensure that these tools meet the needs of a diverse student population (Heinke et al., 2024). Integrating educational theories, such as Bloom's Taxonomy and constructivist principles, into AI tools can enhance their ability to promote critical thinking and creativity. Collaborative efforts between teachers and AI experts are crucial for designing systems that support specific learning outcomes and teaching approaches (Stanka et al., 2024). Moreover, professional development programmes focused on the effective application of AI tools can equip teachers with the essential skills needed to incorporate these tools into their assessment design while maintaining the integrity of traditional pedagogical methods (Alharbi, 2024). Fostering partnerships among teachers, technologists, and policymakers can bridge the technical, ethical, and pedagogical gaps, ensuring that AI-driven assessment tools are both efficient and fair. These collaborative efforts are vital for aligning technological advancements with educational objectives and maximising the potential of AI in higher education.

The lack of familiarity with structured pedagogical frameworks, such as Bloom's Taxonomy, further limits the effectiveness and value of promoting meaningful learning outcomes. However, prior research, such as that by Lee et al. (2021), indicates that embedding AI systems within well-established educational theories can significantly enhance their relevance and application.

Addressing these concerns requires a balanced and interdisciplinary approach. By combining the strengths of teachers, technologists, and policymakers, institutions can develop AI-driven systems that are effective, ethical, and pedagogically sound. Such collaboration ensures that these tools complement conventional assessment practices and make a meaningful contribution to enhancing student learning.

Conclusion

This study aimed to review literature highlighting the challenges and opportunities associated with integrating AI-driven student assessments in higher education institutions (HEIs). Previous research indicates that while AI-driven assessments offer enhancements in efficiency, scalability, and personalised feedback, they are undermined by ethical, technical, and pedagogical challenges. The literature reveals that ethical concerns, such as algorithmic bias and violations of data privacy, diminish the trustworthiness of AI-driven assessments. Although these tools show potential for personalised

feedback, scalability, and efficiency, significant barriers remain due to ethical concerns, technical limitations, and misalignments with pedagogical practices. The lack of alignment with structured pedagogical frameworks, such as Bloom's Taxonomy, further hinders the effectiveness and value of these assessments in promoting meaningful outcomes. Nonetheless, Lee et al. (2021) suggest that embedding AI systems within established educational theories can significantly enhance their relevance and application. Additionally, the literature highlights the necessity for training in essential AI skills to integrate these technologies into assessments, ensuring the sustainability of quality evaluation methods. Prior research underscores the importance of collaboration between educators and AI experts to design systems that support specific learning outcomes and teaching strategies. This study contributes by emphasising the potential of AI-powered assessments in HEIs and presenting strategies to address the challenges associated with their adoption.

As a systematic literature review focused on AI-driven assessments in HEIs, this study has its limitations. Future studies should explore the perceptions of students and teachers regarding the opportunities and challenges linked to the adoption of AI-driven assessments in higher education. Furthermore, this research relies on the Scopus database and focuses on literature published between 2020 and 2024. Future research should broaden its scope to include additional databases, examine the longitudinal impacts of AI in assessments, and investigate its application across diverse educational contexts.

The incorporation of AI-driven tools in HEI assessments presents transformative potential but requires deliberate and collaborative efforts to mitigate existing concerns. Such advancements can reshape education by aligning innovative technologies with pedagogical objectives, ultimately improving outcomes for learners and institutions. The findings of this study have the following implications which must be addressed by university leadership, policymakers, and educators:

- Ethical and data privacy concerns
- Issues of fairness in assessment which may hinder the integration of AI in university evaluations.

Additionally, the study recommends that universities should:

- Implement specialised training programmes for lecturers aimed at enhancing their capacity to utilise AI responsibly and ethically.
- Develop clear guidelines and policies to govern the ethical use of AI in assessments.
- Ensure compliance with regulations and fostering fairness in student evaluations.

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