Review Article

e-ISSN: 2710-2122, p-ISSN: 2710-2114
2025: Vol 7(2), pp 1-17. https://doi.org/10.38140/ijer-2025.vol7.2.05
Interdisciplinary Journal of Education Research

AI Adoption in African Higher Education: A Systematic Review of Benefits and Ethical Implications

Abdul Feroz Maluleke[1]*

AFFILIATIONS

[1]Business and Information Management Services, Faculty of Management Sciences, Tshwane University of Technology, Pretoria, South Africa.

CORRESPONDENCE

Email: malulekaaf@tut.ac.za*

EDITORIAL DATES
Received: 30 April 2025
Revised: 01 August 2025
Accepted: 04 August 2025
Published: 13 August 2025

DOI: 10.38140/ijer-2025.vol7.2.05

Abstract: The accelerated adoption of artificial intelligence (AI) within African higher education presents both challenges and benefits. Numerous studies indicate that integrating AI into higher education can facilitate educational accessibility, enrich teaching and learning, bolster skills development, and streamline administrative tasks, thereby reducing costs. This study employed the PRISMA methodology to select 113 articles from the Web of Science and Scopus databases, spanning the years 2020 to 2024. Thematic content analysis revealed four primary benefits of AI adoption: enhanced teaching and learning, improved administrative efficiency, strategic digital transformation, and expanded access and inclusion. Conversely, the study identified four core ethical challenges: risks to academic integrity through the misuse of generative AI, data privacy concerns, the digital divide and infrastructural inequality, and institutional unpreparedness, including policy and capacity gaps. These findings emphasise the dual imperative of harnessing AI's potential while mitigating associated risks. To support responsible AI integration, the study recommends that African higher education institutions establish context-specific AI governance frameworks, invest in equitable digital infrastructure, embed AI competencies across academic curricula, and provide targeted training for faculty and students. Moreover, fostering intra-African research collaboration and policy dialogue is critical for building contextually relevant, ethical, and inclusive AI adoption pathways. This study contributes to the growing literature on AI in African higher education and offers actionable insights for policymakers, institutional leaders, and scholars committed to advancing digitally responsive and ethically grounded education systems across the continent.

Keywords: Artificial intelligence, higher education, ethical challenges, educational technology.

1. Introduction

The rapid advancement of artificial intelligence (AI) has significantly impacted various sectors globally, particularly higher education. Within higher education institutions (HEIs), AI has considerable potential to enhance administrative efficiency, innovate teaching methodologies, and elevate student engagement and learning outcomes (George & Wooden, 2023). Consequently, the adoption of AI technologies has become central to strategic initiatives aimed at modernising educational practices and responding to contemporary demands for sustainability in education. Despite its promising capabilities, the adoption of AI in higher education is accompanied by notable challenges and ethical concerns. Commonly highlighted benefits include improved administrative processes, enriched educational experiences, and increased accessibility to quality education (Zawacki-Richter et al., 2019; Bond et al., 2021). Nevertheless, AI integration also presents ethical dilemmas, such as threats to data privacy, algorithmic bias, and the exacerbation of digital divides, posing significant risks to equitable educational practices (Dhirani et al., 2023; Chan, 2023). These ethical implications underline the necessity of developing frameworks that balance technological advancement with social responsibility, ensuring sustainable and inclusive educational outcomes.

In the African context, HEIs face distinct challenges, including constrained resources, limited infrastructure, and persistent accessibility gaps (Reinders et al., 2021). In response, AI technologies have been identified as potential catalysts for overcoming these systemic issues. Nevertheless,

How to cite this article:
Maluleke, A. F. (2025). AI adoption in African higher education: A systematic review of benefits and ethical implications. *Interdisciplinary Journal of Education Research, 7*(2), a05. https://doi.org/10.38140/ijer-2025.vol7.2.05

research on AI adoption specifically within African HEIs remains fragmented, and insights from global studies frequently lack direct applicability due to the unique socio-economic and infrastructural contexts in Africa (Hlongwane, 2024; Maimela & Mbonde, 2025; Patel & Ragolane, 2024). Existing literature offers limited and dispersed accounts of the specific benefits and ethical challenges associated with AI integration in African higher education (Khoalenyane & Ajani, 2024; Funda & Francke, 2024; Bakama et al., 2022). This fragmentation creates uncertainty for institutional leaders and policymakers striving to implement AI technologies effectively and ethically. Moreover, existing literature often adopts a techno-optimistic viewpoint, neglecting to thoroughly consider systemic barriers prevalent in African contexts, such as infrastructural deficits, financial constraints, and digital inequalities (Adams et al., 2022; Eze et al., 2021). Ethical considerations, such as academic integrity, data security, and bias in algorithmic processes, while widely recognised globally, are inadequately represented from an African standpoint. This underrepresentation heightens the risk of deploying AI solutions that are misaligned with local cultural and institutional dynamics (Funda & Francke, 2024). As such, there exists a critical need to consolidate and systematically analyse existing knowledge regarding the practical advantages and ethical challenges of AI adoption in African HEIs, providing regionally relevant, evidence-based guidance.

Addressing this identified gap, this systematic review aims to synthesise existing research on AI adoption in African higher education, focusing specifically on documented benefits and ethical implications. By accentuating African perspectives, this review seeks to contribute to a comprehensive and contextually informed understanding of AI integration. This research aligns directly with Sustainable Development Goal (SDG) 4, emphasising inclusive and equitable quality education (United Nations, 2015). Furthermore, comprehensively examining AI adoption is pivotal for understanding the behavioural, contextual, and technological factors influencing the acceptance and effective utilisation of AI tools by educational stakeholders (Pillai et al., 2024). This knowledge is indispensable for developing institutional policies and support structures that facilitate transformative technology integration, including AI-based platforms such as ChatGPT (Al-Mughairi & Bhaskar, 2024). This systematic review is guided by the following research questions:

- RQ1 - What are the main benefits of adopting AI in African higher education?
- RQ2 - What are the major ethical implications of adopting AI in African higher education?

In the next section, we present the theoretical framework based on a review of the literature to ground the systematic investigation undertaken to better understand the benefits and ethical implications of AI adoption in African higher education.

2. Theoretical Framework

In recent years, various theoretical frameworks have been adopted to explain the integration and adoption of emerging technologies, such as AI, for teaching and learning purposes. One such framework is the Unified Theory of Acceptance and Use of Technology (UTAUT). Developed by Venkatesh et al. (2003), UTAUT incorporates four critical determinants of technology use: performance expectancy, effort expectancy, social influence, and facilitating conditions. Unlike other theories that focus primarily on individual or pedagogical factors, UTAUT offers a more comprehensive and integrated view that accounts for both individual and institutional dimensions of AI adoption (Venkatesh, 2022). It has proven particularly effective in studies focusing on educational technology integration and organisational readiness (Jhang, 2024; Alqhtani, 2024; Aavakare, 2019; Sibarani, 2025). Moreover, UTAUT has been previously used to assess the benefits of AI adoption in the higher education context (Venkatesh, 2022; Chen et al., 2024).

Rana et al. (2024) demonstrated the usefulness of UTAUT in explaining AI adoption for academic purposes. They found that trust enhances behavioural intention, while privacy concerns reduce intention but increase the actual use of AI technologies. Additionally, UTAUT was employed to highlight how individual, technological, and environmental factors shape the adoption of AI tools

(Venkatesh, 2022). Through an exploratory study, Rakya (2024) highlights the value of UTAUT not only as a model for technology acceptance but also as a flexible framework for surfacing ethical concerns related to AI adoption in education. Furthermore, Lai et al. (2024) reinforce the usefulness of UTAUT in understanding ChatGPT adoption for assessment support in higher education by identifying trust as the strongest positive predictor of students' behavioural intention. As such, UTAUT offers the strongest alignment with this study's objective of investigating both the benefits and ethical implications of AI adoption within the complex and diverse landscape of African higher education.

3. Materials and Methods

This study employs a systematic review methodology, utilising the PRISMA approach. Through the PRISMA framework, this study ensures rigorous and reproducible results, facilitating a structured method for identifying, screening, and analysing relevant literature on the benefits and ethical challenges related to AI adoption among HEIs in Africa. In line with the PRISMA guidelines, we employed thematic synthesis to identify and outline key findings from the selected studies. After completing the selection and screening phases, full-text articles were imported into ATLAS.ti version 25 for qualitative coding. Using an inductive approach, open coding was applied to extract data segments relevant to the benefits and challenges of AI adoption in African higher education. This process ensured the identification of recurring concepts and the grouping of similar codes to support the early development of themes. The codes were then clustered into categories based on conceptual similarities, and recurring relationships were identified to build preliminary themes. Thereafter, Microsoft Excel was used to map the frequency and distribution of codes and emerging categories across the dataset. The combined use of ATLAS.ti and Excel ensured transparency and traceability in the thematic analysis while supporting the PRISMA objective of providing a clear and systematic account of how key themes were developed from the systematic review data.

3.1 Data sources

To ensure a comprehensive and methodologically rigorous literature search, two highly reputable bibliographic databases (Scopus and Web of Science) were selected as primary sources for identifying relevant studies. This decision was informed by their broad disciplinary coverage, indexing of high-quality peer-reviewed journals, and established utilisation in systematic reviews published in top-tier academic journals. Both Scopus and Web of Science are widely recognised as authoritative and multidisciplinary platforms that provide extensive access to scholarly literature in the fields of education, information technology, and social sciences—areas central to the current review on AI adoption in African higher education. Their inclusion assists in mitigating selection bias and ensures the retrieval of both global and regionally indexed research outputs, including African scholarship that is often underrepresented in smaller databases.

Moreover, Scopus and Web of Science are known for their robust citation tracking capabilities, facilitating the identification of seminal works and emerging themes in the field. Previous high-impact systematic reviews in educational technology and AI (e.g., Bond, 2024; Zawacki-Richter et al., 2019) have similarly relied on these databases as primary sources for data retrieval due to their comprehensive indexing, advanced search functionalities, and methodological transparency. The search strategy applied across both databases yielded a total of 30 eligible studies that met the review's inclusion criteria and passed full-text screening. These studies are listed in the Appendices. By relying on Scopus and Web of Science, this review adheres to established systematic review standards and enhances the reliability, validity, and replicability of the findings.

3.2 Search strategy

To ensure transparency and replicability of the search process, a comprehensive search strategy was developed using carefully selected keywords and Boolean operators. The goal was to capture peer-

reviewed literature focused on the benefits and ethical implications of AI adoption in African higher education, particularly concerning sustainable development and teaching and learning practices. The search was conducted across two multidisciplinary databases, Scopus and Web of Science, which are known for their extensive coverage of high-quality scholarly literature in education, technology, and social sciences. The time frame for inclusion was limited from January 2020 to December 2024 to capture recent developments and ensure relevance. The following primary keywords and phrases were identified based on the research questions, background literature, and commonly used terminology in the field: "*artificial intelligence*" *OR* "*AI*", "*higher education*", "*Africa*" *OR* "*African*", "*ethics*" *OR* "*ethical implications*", "*benefits*", "*sustainability*" *OR* "*sustainable education*", "*education*".

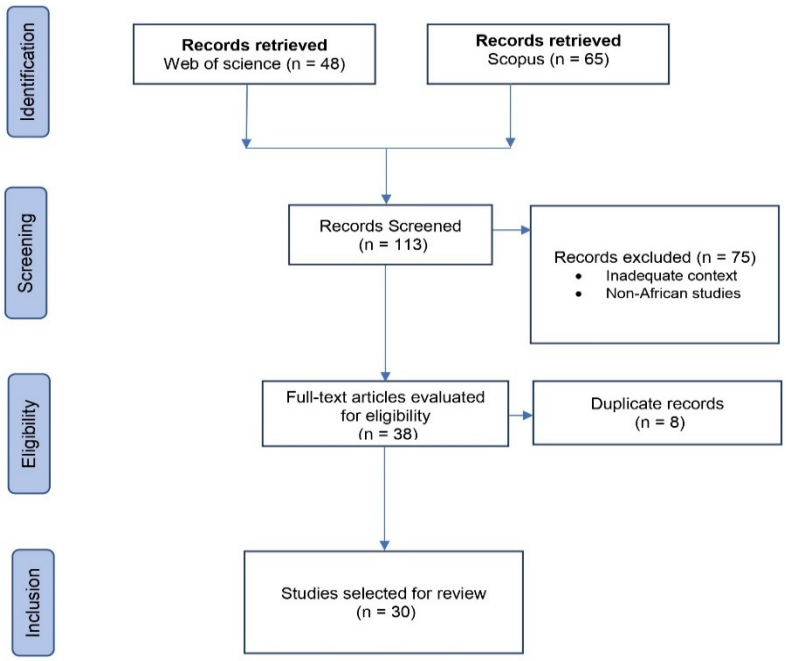

Figure 1: *PRISMA flow diagram of the study selection process*

The diagram illustrates the identification, screening, eligibility, and inclusion stages for studies retrieved from Web of Science and Scopus databases.

3.3 Eligibility criteria

To ensure that the studies selected align with the research objectives, the following eligibility criteria were applied during the screening phase:

- **Publication Date**: Only articles published within the last five years (2020–2024) were included, ensuring a focus on recent advancement.
- **Geographic Relevance:** Studies must specifically address AI adoption in African HEIs, thus excluding research focused on other continents or unrelated contexts.
- **Language:** Only English-language publications were included to maintain consistency and ensure that all findings are accessible for review.
- **Content Relevance**: The studies must discuss both the benefits and ethical implications of AI usage within African higher education institutions. Articles that solely focused on either benefits or ethical considerations without addressing both were excluded.

3.4 Screening and selection process

Following the initial search, all identified publications (113) underwent a two-stage screening process: title and abstract screening, followed by a full-text review. During the title and abstract

screening phase, any study (83) that did not meet the eligibility criteria, along with duplicate studies, was excluded. In the subsequent full-text review phase, the remaining studies (30) were carefully examined to ensure that each study met all eligibility criteria.

3.5 Data extraction and synthesis

For the studies that met the inclusion criteria, data extraction focused on collecting information regarding the benefits of AI in African higher education, ethical considerations, and recommendations provided within each publication. A thematic synthesis approach was employed to analyse findings across these studies, identifying recurring themes and unique insights.

3.6 Presentation of findings

Table 2 below presents the findings in the form of emergent themes, along with the studies supporting each theme. Some of the studies included in this table had cross-cutting themes and therefore appear more than once.

***Table 1**: Summary of key benefits of AI adoption in African higher education*

Theme	Summary of insights	Authors
Enhanced teaching and learning	AI improves personalisation, engagement, and support through tools like tutoring systems, ChatGPT, and virtual learning platforms.	Funda et al. (2024), Tarisayi (2024), Ahmad et al. (2024), Dube & Jacobs (2023), Maphosa & Maphosa (2023), Segbenya et al. (2024), Simelane-Mnisi (2023)
Administrative efficiency and workload reduction	AI automates grading and administration, reducing lecturer workload and enhancing institutional response times.	Twabu & Nakene-Mginqi (2024), Dube & Jacobs (2023), Jacobs & Mncube (2023), Venter et al. (2024), Segbenya et al (2024)
Strategic digital Transformation	AI facilitated rapid transitions during disruptions like COVID-19 and supports curriculum reform aligned with 4IR.	Maphosa & Maphosa (2023), Funda et al. (2024), Fomunyam (2020), Bond (2024), Falebita & Kok (2024), Gudyanga (2024), Mgaiwa (2021), Ngoepe & Wakelin-Theron (2023)
Expanding access and inclusion	AI enhances education access for underdeveloped populations by enabling remote and flexible learning solutions.	Ahmad et al. (2024), Yamoah & Attafuah (2022), Akakpo (2024), Kamukapa et al. (2025), Mutiso (2024), Rzyankina et al. (2024), Tarisayi (2024)

In addition to the benefits, the adoption of AI technology in African higher education has also raised ethical implications. This study identified four key ethical challenges (see Table 2 below).

***Table 2:** Ethical challenges of AI adoption in African higher education*

Theme	Summary of insights	Authors
Academic Integrity and misuse of generative AI	ChatGPT and other GenAI tools raise concerns about cheating, plagiarism, and erosion of critical thinking.	Tang & Eaton (2024), Ahmad et al. (2024), Tarisayi (2024), Opesemowo & Adekomaya (2024), Singh (2023), Tang & Eaton (2024)

Data Privacy and Security	Poor data governance leads to privacy concerns regarding the use and storage of student data.	Twabu & Nakene-Mginqi (2024), Ahmad et al. (2024), Ngoepe et al. (2024), Singaram & Mayer (2022)
Digital Divide and infrastructural inequality	Infrastructure disparities, such as poor internet and electricity, hinder equitable AI integration. AI models may perpetuate social biases, especially due to limited localisation and culturally neutral datasets	Mutiso (2024), Maphosa & Maphosa (2023), Tarisayi (2024), Ahmad et al. (2024), Olaita et al. (2024)
Institutional Readiness and policy gaps	Lack of policies, training, and governance frameworks restrict institutions from ethically and effectively adopting AI.	Kamukapa et al. (2025), Tarisayi (2024), Rzyankina et al. (2024), Tarisayi (2024), Twabu & Nakene-Manqinqi (2024)

4. Discussion of Findings

This section provides a comprehensive discussion of the study's findings, organised around the thematic patterns that emerged from the reviewed literature and empirical evidence. The discussion synthesises insights from both African and global perspectives to elucidate how artificial intelligence (AI) is reshaping teaching, learning, administration, and governance in higher education institutions (HEIs). The themes are categorised into two broad categories: the benefits of AI adoption and the ethical challenges it presents, thereby offering a balanced view of both opportunities and constraints.

4.1 Thematic analysis of the benefits of AI adoption

This subsection examines the key benefits of AI adoption in African higher education institutions (HEIs), focusing on its role in enhancing teaching, learning, administration, and access. It highlights how AI-driven innovations are transforming higher education to become more scalable, efficient, and inclusive.

4.1.1 Enhanced teaching, learning, and student engagement

A consistent insight across the reviewed literature is the capacity of artificial intelligence (AI) to enhance teaching quality, personalisation, and student engagement in African higher education institutions (HEIs). AI-driven tools such as intelligent tutoring systems, adaptive learning platforms, and teacher bots have been recognised for their potential to transform traditional instructional practices by offering personalised, real-time support and facilitating learner autonomy (Funda et al., 2024; Ahmad et al., 2024; Twabu & Nakene-Mginqi, 2024). Bond (2024) identifies the application of such AI tools as a critical area for future research, highlighting their potential to deepen student engagement and improve learning outcomes. Particularly in large or under-resourced class environments where student-lecturer interaction is often constrained, AI presents a scalable solution for individualised learning. AI tools such as ChatGPT and similar generative AI applications further enhance interaction and independent learning by enabling students to engage with content at their own pace, thus supporting learner-centred education (Tarisayi, 2024). These findings are echoed in global literature, which confirms that AI-supported learning environments improve engagement, attentiveness, and active participation, especially in distance learning contexts (Almusaed et al., 2023; Ajani et al., 2024; Mirdad et al., 2024).

Beyond enhancing instructional delivery, AI technologies are demonstrated to address pedagogical gaps by supporting tailored feedback mechanisms, which are critical in overburdened or resource-constrained systems. For instance, Opesemowo and Adekomaya (2024) note that AI enhances attentiveness and participation by catering to diverse learning styles, while Falebita and Kok (2024)

affirm the pivotal role of tools such as ChatGPT in advancing STEM learning environments. The potential of simulation-based AI tools in health sciences further underscores AI's cross-disciplinary relevance; Lewis et al. (2024) demonstrate that students in medical imaging and radiation science programmes leverage AI to reinforce both theoretical knowledge and clinical skills. Additionally, the integration of AI in assessment design, particularly in online and distance learning environments, represents a critical shift towards scalable, efficient, and personalised education (Twabu & Nakene-Mginqi, 2024). AI also assists educators in developing course materials, conducting plagiarism checks, and curating content—functions that not only improve academic integrity but also enhance instructional productivity. Taken together, these insights highlight that AI, when thoughtfully integrated, holds immense potential to enrich student learning experiences and foster deeper academic engagement within African higher education institutions.

4.1.2 Administrative efficiency and workload reduction

The integration of AI-driven systems within African higher education institutions (HEIs) has emerged as a strategic response to administrative inefficiencies and increasing academic workloads. Tools such as automated grading systems, administrative chatbots, and auto-marking platforms have been widely adopted to streamline routine tasks and enhance institutional responsiveness, particularly during crises such as the COVID-19 pandemic (Dube & Jacobs, 2023; Twabu & Nakene-Mginqi, 2024). These innovations facilitate standardised and timely communication with students, reduce repetitive administrative tasks, and support assessment design, thereby alleviating pressure on academic and support staff (Lewis et al., 2024). The deployment of BOTsa, an AI-powered chatbot for academic libraries, further illustrates how AI can enhance service delivery by ensuring continuous access to information and improving user experience in resource-constrained environments (Dube & Jacobs, 2024). As noted by Falebita and Kok (2024), such systems not only improve turnaround times but also empower institutions to reallocate human resources to more cognitively demanding and student-focused activities.

The growing reliance on AI for administrative functions reflects a broader digital shift aimed at increasing institutional efficiency while freeing up academic staff to concentrate on core teaching and research duties. Funda et al. (2024) highlight that AI-enabled automation of grading and feedback reduces administrative bottlenecks and facilitates better time management for educators. Twabu and Nakene-Mginqi (2024) provide empirical support for this claim, showcasing the operational effectiveness of an AI-driven auto-marking system tailored to the South African ODeL context, which ensures timely, consistent, and pedagogically aligned assessment feedback. International research aligns with these findings, emphasising the role of AI in offloading repetitive tasks and enabling innovation in curriculum delivery (Mutambik, 2024). Furthermore, the adoption of Artificial Intelligence for IT Operations (AIOps), as discussed by Funda and Francke (2024), underscores AI's capacity to optimise digital infrastructure, reduce system downtimes, and strengthen the operational backbone of HEIs. These insights collectively affirm that when strategically implemented, AI holds significant promise in enhancing administrative functionality and academic service delivery across African HEIs.

4.1.3 Strategic digital transformation and innovation

AI is increasingly acknowledged as a strategic enabler of digital transformation within African HEIs, particularly in response to disruptive events such as the COVID-19 pandemic. Empirical evidence from Maphosa and Maphosa (2023) and Funda et al. (2024) confirms that AI tools facilitated swift transitions to online and remote learning, especially in resource-constrained environments. Beyond crisis response, AI is promoting structural reforms in curriculum design and instructional delivery aligned with the imperatives of the Fourth Industrial Revolution (4IR). Scholars such as Fomunyam (2020) and Gudyanga (2024) argue that the adoption of AI has catalysed a rethinking of pedagogical frameworks, enabling more flexible, responsive, and future-oriented learning environments. This

aligns with broader digital transformation objectives aimed at equipping students with the skills necessary for success in a technology-driven global economy. As Olaitan, Vijayalekshmi, and Kumar (2024) contend, the strategic integration of AI and other 4IR technologies into South African higher education curricula is pivotal in modernising academic programmes and enhancing graduate employability.

The literature further illustrates that AI is reshaping the skills landscape, prompting African HEIs to embed digital competencies across disciplines. Kamukapa et al. (2025) and Ngoepe, Jacobs, and Mojapelo (2024) stress the importance of formally incorporating AI literacy into academic programmes to prepare students for emerging job markets. This perspective is reinforced by Ngoepe and Wakelin-Theron (2024), who note that the influence of AI is particularly evident in fields such as hospitality, where evolving technologies demand new skill sets. Similarly, Singaram and Mayer (2024) advocate for a forward-thinking institutional culture that embraces AI as a driver of competitiveness and innovation. However, uneven adoption across the continent remains a concern. Jin et al. (2025) and Slimi and Carballido (2023) caution that disparities in infrastructure, policy, and institutional readiness could impede the realisation of AI's full potential in transforming African higher education. Mgaiwa (2021) underscores the urgency for universities in sub-Saharan Africa to rethink curricula in light of the disruptive impact of AI and robotics on global labour markets. Overall, the strategic implementation of AI not only modernises education but also advances broader sustainable development and workforce transformation goals across the continent.

4.1.4 Expanding access and inclusion

The integration of AI into African higher education is increasingly recognised as a transformative enabler of access and inclusion, particularly in under-resourced and marginalised communities. Scholars such as Yamoah and Attafuah (2022) and Ahmad et al. (2024) emphasise AI's potential to broaden learning opportunities through flexible, remote learning technologies, thereby aligning with the broader continental objective of equitable education for all. In environments where traditional delivery models fall short, AI-powered systems offer scalable alternatives that support distance learning and foster greater participation. For example, adaptive learning platforms and AI-enabled applications facilitate differentiated instruction, catering to diverse learning needs and promoting inclusive engagement (Opesemowo & Adekomaya, 2024). Rzyankina et al. (2024) further emphasise the impact of AI-powered e-textbooks, which provide interactive and affordable access to educational materials—a critical intervention in resource-constrained settings marked by overcrowded classrooms and textbook shortages. AI can, therefore, ensure that African HEIs bridge the gap in educational access among poor communities. This is crucial for attaining sustainability and economic growth.

Institutional efforts to expand access during emergencies, such as the COVID-19 pandemic, further validate AI's role in ensuring continuity and support for marginalised learners. Dube and Jacobs (2024) document the effectiveness of AI-powered digital library services in sustaining academic engagement during campus closures, particularly for remote students. However, despite these advancements, persistent infrastructural inequalities continue to pose a barrier to inclusive AI adoption. As Olaitan et al. (2024) caution, limited bandwidth, unstable electricity, and unequal digital infrastructure risk reinforcing exclusion rather than alleviating it. Moreover, access to AI competencies remains uneven across academic disciplines. Kamukapa et al. (2025) observe that digital skills training is often relegated to elective courses in public administration programmes, limiting the reach of AI literacy among future professionals. This reflects a broader need for the systemic integration of AI into core curricula to ensure inclusive and equitable participation in the digital economy. Without strategic intervention, the promise of AI to democratise access risks being overshadowed by structural disparities that continue to marginalise significant segments of the student population.

4.2 Thematic analysis of ethical challenges of AI adoption

This subsection discusses the ethical challenges associated with AI adoption in African higher education institutions (HEIs), including issues of academic integrity, data privacy, digital inequality, and institutional readiness. It emphasises the need for governance frameworks and policy interventions to ensure that AI integration aligns with ethical and educational standards.

4.2.1 Academic integrity and misuse of generative AI

The rapid proliferation of generative AI tools such as ChatGPT in African HEIs has introduced significant ethical challenges, particularly concerning academic integrity. While these tools offer support for scholarly writing, they are increasingly being misused to generate unauthorised content, enabling new forms of plagiarism and undermining critical thinking skills (Ahmad et al., 2024; Singh, 2023; Tang & Eaton, 2024). This misuse not only compromises the authenticity of student work but also threatens the core values of independent reasoning and originality that are essential to higher education. Singh (2023) warns that overreliance on AI-generated content without adequate oversight is eroding traditional academic standards, necessitating urgent reforms in assessment design and academic honesty protocols. Globally, similar concerns have emerged, with Bin-Nashwan, Sadallah, and Bouteraa (2023) cautioning that the unregulated use of ChatGPT places academic integrity "in the balance," calling for clearer guidelines and institutional policies.

In African HEIs, these integrity issues are further exacerbated by the absence of robust governance frameworks and clearly articulated policies on AI use. Tarisayi (2024) argues that unchecked AI integration, without ethical safeguards, risks weakening institutional credibility and diminishing students' analytical competencies. This concern aligns with findings by Balalle and Pannilage (2025), who note that institutions globally are struggling to reassess and adapt academic integrity frameworks to the evolving landscape shaped by AI technologies. The limitations of existing assessment models are also evident in digital learning environments, where AI-powered proctoring tools have often failed to deter dishonest behaviours. Jacobs and Mncube (2023) demonstrate that students routinely bypass such tools, revealing both technological and procedural weaknesses in maintaining integrity during online assessments. Tang and Eaton (2024) further highlight the increasing presence of AI-generated content in scholarly outputs, including instances where ChatGPT-generated text has been integrated into academic publications without proper attribution, signalling a widespread lack of awareness or disregard for responsible AI use.

These challenges also reflect broader student anxieties. Lewis et al. (2024) report that students question the reliability and contextual relevance of AI-generated responses, raising concerns about quality, accuracy, and ethical usage. Ahmad et al. (2024) note that postgraduate students and female respondents, in particular, express apprehension about the integrity risks posed by generative AI—fearing not only academic dishonesty but also the erosion of essential cognitive and evaluative skills. Currie (2023) adds that while ChatGPT and similar tools have value when used appropriately, improper use can distort learning outcomes and compromise institutional standards. Collectively, these findings affirm that while generative AI holds pedagogical promise, if left unregulated, its misuse could compromise the ethical foundation of academic practice. Institutions must therefore adopt a balanced approach, integrating AI in ways that uphold academic integrity, protect learner autonomy, and ensure transparent authorship standards across all levels of higher education.

4.2.2 Data privacy and security

The integration of AI technologies into higher education environments has heightened concerns regarding the collection, storage, and ethical use of student data, particularly within African contexts where data protection frameworks remain underdeveloped. Recent studies underscore the urgency of addressing these concerns, especially as AI-based assessment and feedback systems increasingly rely on personal academic data (Twabu & Nakene-Mginqi, 2024; Ahmad et al., 2024). Twabu and

Nakene-Mginqi (2024) argue that the absence of clear governance frameworks places students' academic records at risk, making strict adherence to ethical standards and compliance with data privacy regulations imperative for institutions. These concerns are further echoed by Venter et al. (2024), who caution that AI-generated feedback, while efficient, must be contextually appropriate and pedagogically sound. The authors advocate for continuous human oversight, faculty training, and institutional quality assurance mechanisms to ensure that AI systems enhance rather than undermine educational standards. Without such safeguards, there is a significant risk that AI tools, intended to support academic innovation, may inadvertently violate students' rights to data security and informed consent, thus eroding trust in digital educational technologies. This reflects a broader ethical challenge in AI deployment that must be addressed through national or regional policy development, institutional capacity building, and culturally responsive data governance strategies.

4.2.3 Digital divide and infrastructural inequality

While AI holds transformative potential for African institutions of higher learning, its equitable adoption is significantly constrained by deep-rooted infrastructural inequalities and the persistent digital divide. As Olaitan et al. (2024) caution, disparities in bandwidth, hardware, and digital infrastructure between urban and rural institutions continue to limit meaningful participation in AI-enabled education. Students in underdeveloped regions face compounded challenges, including unreliable electricity and limited internet access, which directly hinder their ability to benefit from AI-supported learning platforms. Rzyankina et al. (2024) affirm that although digital tools such as AI-powered learning materials may partially address resource shortages in least-developed countries, these benefits remain inaccessible without sustained investment in institutional connectivity and infrastructure. The authors stress the need for scalable, locally adapted interventions that align AI deployment with national development objectives to ensure inclusive access and mitigate educational inequality.

Beyond infrastructure, the marginalisation of African perspectives in AI development presents additional risks of cultural misalignment and algorithmic bias. Generic AI tools that lack contextual sensitivity may fail to address the linguistic, pedagogical, and socio-economic realities of African learners, further entrenching exclusion. Kamukapa et al. (2025) note that this inequality is amplified when AI education is restricted to elective modules rather than being embedded into core curricula. Such curricular fragmentation denies many students, especially those in disadvantaged institutions, the opportunity to build essential digital competencies needed in an AI-driven economy. The authors advocate for the mainstream integration of AI literacy to bridge both access and skills gaps across HEIs. As Dube and Jacobs (2023) illustrate, even where digital infrastructure exists, its potential remains unrealised without institutional readiness, adequate faculty training, and sustained support. Without deliberate, equity-focused planning, the expansion of AI in higher education risks benefiting only a privileged minority, thereby perpetuating and not resolving access disparities across the African higher education landscape.

4.2.4 Institutional readiness and policy gaps

Despite the growing interest in AI integration, the effective and ethical adoption of artificial intelligence in African higher HEIs is significantly hindered by gaps in institutional readiness. Foundational deficiencies—ranging from infrastructural weaknesses to a lack of strategic planning—continue to obstruct scalable implementation (Kamukapa et al., 2025; Tarisayi, 2024). As Jöhnk et al. (2021) argue, organisational AI readiness is a critical determinant of successful adoption, encompassing technical, human, and cultural preparedness. However, many African HEIs exhibit fragmented governance frameworks, limited digital literacy among academic staff, and an absence of coherent institutional policies to guide AI integration. These shortcomings manifest in curriculum fragmentation and inadequate oversight of AI-enabled teaching and assessment practices. The

readiness gap is particularly concerning in contexts where institutional governance lacks the agility to adapt to the fast-paced evolution of educational technologies.

Several scholars have emphasised the urgent need for the structured integration of AI into curricula and institutional frameworks, as well as instruction in digital literacy and capacity building to support academics (Lewis et al., 2024; Segbenya et al., 2024). Al-Ghnimi et al. (2022) propose a comprehensive readiness framework that addresses faculty preparedness, institutional vision, digital infrastructure, and stakeholder alignment—all of which are lacking in many African HEIs. Bond (2024) and Gudyanga (2024) further highlight Africa's underrepresentation in global educational technology research, attributing it to systemic limitations in funding, research capacity, and institutional autonomy. These constraints also extend to the development of localised AI solutions, resulting in a continued reliance on Western-driven platforms that may not reflect African socio-cultural and pedagogical contexts. Without deliberate investment in intra-continental collaboration and policy reform, the risk of exclusion from global AI advancements persists.

National and institutional governance deficiencies further complicate efforts to integrate AI meaningfully into African HEIs. Opesemowo and Adekomaya (2024) advocate for the development of coordinated national AI education policies to ensure ethical alignment with sustainability and development goals. Similarly, Funda et al. (2024) and Funda and Francke (2024) identify resistance to change, low levels of technological literacy, and infrastructural constraints as major hindrances to equitable AI adoption. These challenges extend to the academic publishing space, where Tang and Eaton (2024) report the unregulated presence of AI-generated content in scholarly outputs, signalling weak editorial oversight and a lack of ethical literacy in digital authorship. This may be compounded by regional disparities in awareness and usage of AI tools, as noted by Ahmad et al. (2024), and the inconsistent quality of AI-generated feedback observed by Venter et al. (2024). Addressing these readiness and governance gaps requires more than just technical interventions; there is a need for an epistemically inclusive and contextually grounded curriculum. Blending African and Western knowledge systems is necessary to ensure that AI adoption is not only effective but also culturally and pedagogically relevant.

5. Recommendations for Future Directions

In light of the findings and conclusions of this review, several strategic actions are recommended to support the responsible and sustainable adoption of AI in African higher education institutions. While the study affirms AI's potential to enhance educational quality, access, and administrative efficiency, it also highlights critical ethical, infrastructural, and institutional limitations that must be addressed through coordinated policy and practice.

Institutions should prioritise the establishment of robust AI governance frameworks. These frameworks must clearly define ethical standards for academic integrity, data privacy, authorship, and responsible use. Importantly, such policies should be context-specific and aligned with the institutional missions and values of African HEIs, ensuring that AI adoption reflects local priorities and safeguards educational integrity. Equally important is the need for sustained investment in digital infrastructure. Governments and higher education institutions should expand access to reliable internet connectivity, improve hardware availability, and strengthen technical support systems, particularly in rural and under-resourced regions. These infrastructural enhancements are essential for reducing the digital divide and promoting equitable participation in AI-enabled learning environments.

Curriculum reform must also be prioritised to embed AI competencies across both STEM and non-STEM programmes. Preparing students for an increasingly AI-driven global economy requires the integration of digital and AI literacy into core academic programmes. This should be supported by continuous professional development opportunities for academic staff and targeted digital skills

training for students, thereby building institutional capacity for ethical and effective AI implementation. Moreover, fostering regional collaboration across African countries is vital. Intra-African partnerships can facilitate the co-development of culturally relevant policies, support the localisation of AI technologies, and enable the exchange of best practices. Such collaboration will ensure that AI integration in African higher education is not only technically feasible but also pedagogically meaningful and socially inclusive. By addressing these interrelated areas, African HEIs will be better positioned to harness AI as a tool for advancing sustainable, ethical, and context-responsive higher education systems.

6. Conclusion, Implications and Recommendations

This study aimed to systematically investigate the benefits and ethical implications of adopting artificial intelligence in African higher education institutions. Guided by the PRISMA methodology, a total of 30 peer-reviewed articles published between 2020 and 2024 were reviewed from two reputable academic databases, Scopus and Web of Science. The review was structured around two research questions: first, to explore the main benefits of AI adoption in African higher education, and second, to examine the major ethical implications associated with its use. In response to the first research question, the findings reveal that AI offers significant advantages for African higher education. These advantages include enhanced teaching and learning experiences through personalised and adaptive instructional tools, improved administrative efficiency through automation, support for strategic digital transformation, and the expansion of access and inclusion through remote and flexible learning models. These benefits highlight AI's potential to strengthen educational delivery and institutional responsiveness across the continent.

Addressing the second research question, the review also identifies pressing ethical concerns that accompany the rapid integration of AI. Key challenges include academic integrity violations related to the misuse of generative AI, data privacy vulnerabilities due to inadequate governance structures, infrastructural inequalities that exacerbate the digital divide, and institutional unpreparedness in policy and curriculum design. These issues underscore the urgent need for clear ethical guidelines, comprehensive digital literacy training, inclusive infrastructure development, and coordinated national and institutional AI policies. This review contributes to the emerging discourse on AI in African higher education by providing a balanced and context-sensitive synthesis of recent scholarship. It offers practical insights for policymakers, institutional leaders, educational technologists, and researchers aiming to foster responsible and sustainable AI integration. While the study was methodologically rigorous, its scope was limited to articles indexed in Scopus and Web of Science and to the 2020–2024 publication window. Future research may benefit from including grey literature and broader database coverage to capture a more diverse and representative spectrum of perspectives on AI adoption in African higher education.

7. Declarations

Funding: The study did not receive any external funding. However, the Article Processing Charge (APC) was covered by the Tshwane University of Technology, Faculty of Management Sciences.

Acknowledgement: The author declares no acknowledgements.

Conflict of interest: The author declares no conflict of interest.

Data Availability Statement: This review is based entirely on publicly available data and information sourced from peer-reviewed articles, reports, and other academic publications cited in the manuscript. No new primary data were generated or analysed during this study. Readers may refer to the cited sources for detailed information.

References

Aavakare, M., & Nikou, S. (2020, June). University staff's everyday engagement with digital technology: Exploring the role of information literacy and digital literacy. In *Proceedings of the 23rd ITS Biennial Conference* (pp. 1–15). ECONSTOR.

Adams, D., & Thompson, P. (2025). Transforming school leadership with artificial intelligence: Applications, implications, and future directions. *Leadership and Policy in Schools, 24*(1), 77–89.

Ahmad, M., Subih, M., Fawaz, M., Alnuqaidan, H., Abuejheisheh, A., Naqshbandi, V., & Alhalaiqa, F. (2024). Awareness, benefits, threats, attitudes, and satisfaction with AI tools among Asian and African higher education staff and students. *Journal of Applied Learning and Teaching, 7*(1), 1–14. https://doi.org/10.37074/jalt.2024.7.1.10

Ahmad, S., Nasir, N., Halmi, S., & Adnan, N. (2024). A bibliometric analysis: Navigating publication trends in academic dishonesty in higher education. *AKADEMIKA, 94*(2), 419–437. https://doi.org/10.17576/akad-2024-9402-24

Ajani, O. A., Gamede, B., & Matiyenga, T. C. (2024). Leveraging artificial intelligence to enhance teaching and learning in higher education: Promoting quality education and critical engagement. *Journal of Pedagogical Sociology and Psychology, 7*(1), 54–69. https://doi.org/10.33902/jpsp.202528400

Akakpo, M. G. (2024). Skilled for the future: Information literacy for AI use by university students in Africa and the role of librarians. *Internet Reference Services Quarterly, 28*(1), 19–26. https://doi.org/10.1080/10875301.2023.2280566

Al-Ghnimi, S., Al-Maskari, A., & Al-Riyami, T. (2022). A framework to measure higher education institutions' readiness for the fourth industrial revolution. *NeuroQuantology, 20*(10), 7436–7445. https://doi.org/10.1108/jarhe-05-2022-0169

Al-Mughairi, H., & Bhaskar, P. (2024). Exploring the factors affecting the adoption of AI techniques in higher education: Insights from teachers' perspectives on ChatGPT. *Journal of Research in Innovative Teaching & Learning*, 1–14. https://doi.org/10.1108/jrit-09-2023-0129

Almusaed, A., Almssad, A., Yitmen, I., & Homod, R. Z. (2023). Enhancing student engagement: Harnessing "AIED"'s power in hybrid education—A review analysis. *Education Sciences, 13*(7), 632. https://doi.org/10.3390/educsci13070632

Alqahtani, N., & Ahmed, S. (2025, March). Evaluating the practical application of generative artificial intelligence in higher education classrooms. In *Society for Information Technology & Teacher Education International Conference* (pp. 1578–1590). Association for the Advancement of Computing in Education (AACE).

Bakama, E. M., Mukwakungu, S. C., & Sukdeo, N. (2022, June). Digital learning readiness of higher education institutions in the 4IR era during the COVID-19 pandemic: Case of a university in South Africa. In *2022 IEEE 28th International Conference on Engineering, Technology and Innovation (ICE/ITMC) & 31st International Association for Management of Technology (IAMOT) Joint Conference* (pp. 1–5). IEEE.

Balalle, H., & Pannilage, S. (2025). Reassessing academic integrity in the age of AI: A systematic literature review on AI and academic integrity. *Social Sciences & Humanities Open,* 1–11. https://doi.org/10.1016/j.ssaho.2025.101299

Bin-Nashwan, S. A., Sadallah, M., & Bouteraa, M. (2023). Use of ChatGPT in academia: Academic integrity hangs in the balance. *Technology in Society, 75*. https://doi.org/10.1016/j.techsoc.2023.102370

Bond, M. (2024). The International Journal of Educational Technology in Higher Education: Content and authorship analysis 2010–2024. *International Journal of Educational Technology in Higher Education, 21*(1), 1-14. https://doi.org/10.1186/s41239-024-00492-z

Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., & Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: A systematic evidence

map.*International Journal of Educational Technology in Higher Education, 17*(1), 2. https://doi.org/10.1186/s41239-019-0176-8

Chan, C. K. Y. (2023). A comprehensive AI policy education framework for university teaching and learning. *International Journal of Educational Technology in Higher Education, 20*(1), 20-38. https://doi.org/10.1186/s41239-023-00408-3

Chen, G., Fan, J., & Azam, M. (2024). Exploring artificial intelligence (AI) chatbots adoption among research scholars using unified theory of acceptance and use of technology (UTAUT).*Journal of Librarianship and Information Science*. https://doi.org/10.1177/09610006241269189

Currie, G. M. (2023, September). Academic integrity and artificial intelligence: Is ChatGPT hype, hero or heresy? *InSeminars in Nuclear Medicine*(Vol. 53, No. 5, pp. 719-730). WB Saunders. https://doi.org/10.1053/j.semnuclmed.2023.04.008

Dhirani, L. L., Mukhtiar, N., Chowdhry, B. S., & Newe, T. (2023). Ethical dilemmas and privacy issues in emerging technologies: *A review. Sensors, 23*(3), 1151. https://doi.org/10.3390/s23031151

Dube, T., & Jacobs, L. (2023). Academic library services extension during the COVID-19 pandemic: Considerations in higher education institutions in the Gauteng Province, South Africa. *Library Management, 44*(1/2), 17–39. https://doi.org/10.1108/LM-04-2022-0039

Eze, A. O., & Onah, B. I. (2024). Analysis of educational artificial intelligence tools utilized by vocational education lecturers in teaching and learning in public universities in Enugu State, Nigeria. *E-Learning and Digital Media*, *0*(0). https://doi.org/10.1177/20427530241297289

Falebita, O. S., & Kok, P. J. (2024). Strategic goals for artificial intelligence integration among STEM academics and undergraduates in African higher education: A systematic review. *Discover Education, 3*(1). https://doi.org/10.1007/s44217-024-00252-1

Fomunyam, K. G. (2020a). Deterritorialising to reterritorialising the curriculum discourse in African higher education in the era of the fourth industrial revolution. *International Journal of Higher Education, 9*(4), 27–34. https://doi.org/10.5430/ijhe.v9n4p27

Fomunyam, K. G. (2020b). Theorising the itinerant curriculum as the pathway to relevance in African higher education in the era of the fourth industrial revolution. *International Journal of Education and Practice, 8*(2), 248–256. Scopus. https://doi.org/10.18488/journal.61.2020.82.248.256

Fomunyam, K. G. (2020). Deterritorialising to reterritorialising the curriculum discourse in African higher education in the era of the fourth industrial revolution. *International Journal of Higher Education, 9*(4), 27–34. https://doi.org/10.5430/ijhe.v9n4p27

Funda, V., & Francke, E. (2024). Factors influencing AIOps adoption at a selected higher education institution in South Africa. *Issues in Information Systems, 25*(1), 103–116. https://doi.org/10.48009/1_iis_2024_109

Funda, V., Busiswa, N., & Mbangeleli, A. (2024). Artificial intelligence (AI) as a tool to address academic challenges in South African higher education. *International Journal of Learning, Teaching and Educational Research, 23*(11), 520–537. https://doi.org/10.26803/ijlter.23.11.27

George, B., & Wooden, O. (2023). Managing the strategic transformation of higher education through artificial intelligence. *Administrative Sciences, 13*(9), 196. https://doi.org/10.3390/admsci13090196

Gudyanga, R. (2024). Research trends and gaps in the adoption of immersive reality technologies in African education systems. *International Journal of Learning, Teaching and Educational Research*, 23(11), 232–253. https://doi.org/10.26803/ijlter.23.11.12

Hlongwane, J., Shava, G. N., Mangena, A., & Muzari, T. (2024). Towards the integration of artificial intelligence in higher education, challenges and opportunities: The African context, a case of Zimbabwe. *International Journal Resource Innovation and Social Sciences*, 8(3S), 417–435. https://doi.org/10.47772/ijriss.2024.803028s

Jacobs, L., & Mncube, S. (2023). Proctoring as a human substitution for online summative assessments in a comprehensive open distance e-learning institution: Opportunities and obstacles. *Independent Journal of Teaching and Learning*, *18*(2), 93–108.

Jhang, R. R. (2024). Exploring the acceptance of Taiwanese college students using ChatGPT for translation revision feedback [Master's thesis, National Taiwan Normal University, Taiwan].

Jin, Y., Yan, L., Echeverria, V., Gašević, D., & Martinez-Maldonado, R. (2025). Generative AI in higher education: A global perspective of institutional adoption policies and guidelines. *Computers and Education: Artificial Intelligence*, *8*, 100348. https://doi.org/10.1016/j.caeai.2024.100348

Jöhnk, J., Weißert, M., & Wyrtki, K. (2021). Ready or not, AI comes—an interview study of organizational AI readiness factors. *Business & Information Systems Engineering*, 63(1), 5–20. https://doi.org/10.1007/s12599-020-00676-7

Kamukapa, T., Lubinga, S., Masiya, T., & Sono, L. (2025). Assessing the integration of AI competencies in undergraduate public administration curricula in selected South African higher education institutions. *Teaching Public Administration*, 43(1), 108–125. https://doi.org/10.1177/01447394241266443

Kamukapa, T. D., Lubinga, S., Masiya, T., & Sono, L. (2024). Assessing the integration of AI competencies in undergraduate public administration curricula in selected South African higher education institutions. *Teaching Public Administration*, *43*(1), 108–125. https://doi.org/10.1177/01447394241266443

Khoalenyane, N. B., & Ajani, O. A. (2024). A systematic review of artificial intelligence in higher education—South Africa. *Social Sciences and Education Research Review*, *11*(1), 17–26.

Lai, C. Y., Cheung, K. Y., Chan, C. S., & Law, K. K. (2024). Integrating the adapted UTAUT model with moral obligation, trust, and perceived risk to predict ChatGPT adoption for assessment support: A survey with students. *Computers and Education: Artificial Intelligence*, *6,* 100246. https://doi.org/10.1016/j.caeai.2024.100246

Lewis, S., Bhyat, F., Casmod, Y., Gani, A., Gumede, L., Hajat, A., Hazell, L., Kammies, C., Mahlaola, T. B., Mokoena, L., & Vermeulen, L. (2024). Medical imaging and radiation science students' use of artificial intelligence for learning and assessment. *Radiography*, *30*, 60–66. https://doi.org/10.1016/j.radi.2024.10.006

Maimela, C., & Mbonde, P. (2025). Artificial Intelligence (AI) in South African Universities: Curriculum Transformation and Decolonisation–Aid or Obstacle?. *Frontiers in Sociology*, *10*, 1543471. https://doi.org/10.3389/fsoc.2025.1543471

Maphosa, V., & Maphosa, M. (2023). African higher education institution's response to COVID-19: A bibliometric analysis and visualisation study. *Cogent Education*, *10*(2), 1-13. https://doi.org/10.1080/2331186X.2023.2273002

Mgaiwa, S. J. (2021). Fostering graduate employability: Rethinking Tanzania's university practices. *SAGE Open*, *11*(2). https://doi.org/10.1177/21582440211006709

Mirdad, K., Daeli, O. P. M., Septiani, N., Ekawati, A., & Rusilowati, U. (2024). Optimizing student engagement and performance using AI-enabled educational tools. *Journal of Computer Science and Technology Application*, *1*(1), 53–60.

Mutambik, I. (2024). The use of AI-driven automation to enhance student learning experiences in the KSA: An alternative pathway to sustainable education. *Sustainability, 16*(14), 5970. https://doi.org/10.3390/su16145970

Mutiso, R. M. (2024). AI in Africa: Basics over buzz. *Science (New York, N.Y.)*, *383*(6690), eado8276. https://doi.org/10.1126/science.ado8276

Ngoepe, L. L., & Wakelin-Theron, N. (2023). Factors that contribute towards the employability of hospitality graduates. *African Journal of Hospitality, Tourism and Leisure*, *12*(4), 1495–1511. https://doi.org/10.46222/ajhtl.19770720.445

Ngoepe, M., Jacobs, L., & Mojapelo, M. (2024). Inclusion of digital records in the archives and records management curricula in a comprehensive open distance e-learning environment. *Information Development*, 40(2), 190–201. https://doi.org/10.1177/02666669221081812

Olaitan, O. O., Vijayalekshmi, S., & Kumar, D. V. (2024). Integrating 4IR technologies into higher education in South Africa: Opportunities, challenges, and strategies. *International Journal of Learning, Teaching and Educational Research*, 23(11), 157–179. https://doi.org/10.26803/ijlter.23.11.8

Opesemowo, O. A. G., & Adekomaya, V. (2024). Harnessing artificial intelligence for advancing sustainable development goals in South Africa's higher education system: A qualitative study. *International Journal of Learning, Teaching and Educational Research, 23*(3), 67–86. https://doi.org/10.26803/ijlter.23.3.4

Patel, S., & Ragolane, M. (2024). The implementation of artificial intelligence in South African higher education institutions: Opportunities and challenges. *Technium Education and Humanities, 9,* 51–65. https://doi.org/10.47577/teh.v9i.11452

Pillai, R., Sivathanu, B., Metri, B., & Kaushik, N. (2024). Students' adoption of AI-based teacher-bots (T-bots) for learning in higher education. *Information Technology & People, 37*(1), 328–355. https://doi.org/10.1108/itp-02-2021-0152

Rakya, Z. H. (2024). Exploring ethical implications and ethical considerations of AI in eLearning in UAE higher education using UTAUT and social constructivism: An exploratory study of UAE postgraduates. *Studies in Technology Enhanced Learning, 4*(1), 1-13. https://doi.org/10.21428/8c225f6e.f9592622

Rana, M. M., Siddiqee, M. S., Sakib, M. N., & Ahamed, M. R. (2024). Assessing AI adoption in developing country academia: A trust and privacy-augmented UTAUT framework. *Heliyon, 10*(18), 14. https://doi.org/10.1016/j.heliyon.2024.e37569

Reinders, S., Dekker, M., & Falisse, J. B. (2021). Inequalities in higher education in low-and middle-income countries: A scoping review of the literature. *Development Policy Review, 39*(5), 865-889. https://doi.org/10.1111/dpr.12535

Rzyankina, E., George, F., & Simpson, Z. (2024). Enhancing conceptual understanding in engineering mathematics through e-textbooks. *IEEE Transactions on Education, 67*(4), 534–541. https://doi.org/10.1109/TE.2024.3387102

Segbenya, M., Senyametor, F., Aheto, S., Agormedah, E., Nkrumah, K., & Kaedebi-Donkor, R. (2024). Modelling the influence of antecedents of artificial intelligence on academic productivity in higher education: A mixed method approach. *Cogent Education, 11*(1), 1-16. https://doi.org/10.1080/2331186X.2024.2387943

Sibarani, B. E. (2025). Exploring the impact of artificial intelligence in enhancing the effectiveness of distance education: The moderating role of student engagement. *Turkish Online Journal of Distance Education, 26*(2), 133-148. https://doi.org/10.17718/tojde.1496906

Simelane-Mnisi, S. (2023). Effectiveness of LMS digital tools used by the academics to foster students' engagement. *Education Sciences, 13*(10). https://doi.org/10.3390/educsci13100980

Singaram, S., & Mayer, C. (2022). The influence of the Fourth Industrial Revolution on organisational culture: An empirical investigation. *Frontiers in Psychology, 13,* 1-13. https://doi.org/10.3389/fpsyg.2022.919157

Singh, M. (2023). Maintaining the integrity of the South African university: The impact of ChatGPT on plagiarism and scholarly writing. *South African Journal of Higher Education, 37*(5), 203–220. https://doi.org/10.20853/37-5-5941

Slimi, Z., & Carballido, B. V. (2023). Navigating the ethical challenges of artificial intelligence in higher education: An analysis of seven global AI ethics policies. *TEM Journal, 12*(2), 590-602. https://doi.org/10.18421/tem122-02

Tang, G., & Eaton, S. E. (2024). A rapid investigation of artificial intelligence generated content footprints in scholarly publications. *Journal of Scholarly Publishing, 55*(3), 337–355. https://doi.org/10.3138/jsp-2023-0079

Tarisayi, K. (2024). ChatGPT use in universities in South Africa through a socio-technical lens. *Cogent Education, 11*(1), 1-20. https://doi.org/10.1080/2331186X.2023.2295654

Twabu, K., & Nakene-Mginqi, M. (2024). Developing a design thinking artificial intelligence driven auto-marking/grading system for assessments to reduce the workload of lecturers at a higher learning institution in South Africa. *Frontiers in Education, 9,* 1-13 https://doi.org/10.3389/feduc.2024.1512569

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. https://sdgs.un.org/2030agenda

Venkatesh, V. (2022). Adoption and use of AI tools: A research agenda grounded in UTAUT. *Annals of Operations Research, 308*(1), 641–652. https://doi.org/10.1007/s10479-020-03918-9

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425–478. https://doi.org/10.2307/30036540

Venter, J., Coetzee, S. A., & Schmulian, A. (2024). Exploring the use of artificial intelligence (AI) in the delivery of effective feedback. *Assessment & Evaluation in Higher Education*, 1–21. https://doi.org/10.1080/02602938.2024.2415649

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