Generative AI in African Higher Education: A Systematic Review of Opportunities, Ethical Challenges, and Institutional Readiness

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Abstract

Generative artificial intelligence (GenAI) is transforming higher education globally, yet its implications for access, inclusion, personalised learning, assessment, and research productivity in African higher education institutions (HEIs) is relatively underexplored. This systematic review synthesises empirical evidence on how GenAI is being used in African HEIs, highlighting reported opportunities, ethical challenges, and institutional preparedness. We searched six academic databases, including Education Source Ultimate, Web of Science, Academic Search Ultimate, ERIC, APA PsycINFO, and Humanities Source Ultimate, for peer-reviewed journal articles and conference papers published in English between 2022 and 2025. Of the 110 records identified, 82 were screened after 28 duplicates were removed. We conducted full-text reviews of 51 articles, of which 39 met the inclusion criteria. Our findings suggest that the reviewed literature on GenAI in African HEIs is expanding but uneven, with most studies concentrated in South Africa, Egypt, Nigeria, and Ghana. Reported opportunities included personalised learning support, multilingual learning, academic writing assistance, and research-related tasks, while key concerns included academic integrity, uneven digital access, and limited institutional readiness. Overall, the review indicates that GenAI has potential to support teaching, learning, and research in African higher education, but responsible integration will require clearer policy guidance, sustained professional development, and stronger digital infrastructure.

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Practitioner Notes

1. Educators should explore how GenAI can support inclusive pedagogies that accommodate linguistic and cultural diversity in classrooms.
2. Institutional leaders need to create shared spaces for dialogue where faculty and students can critically engage with GenAI tools.
3. Cross-continental collaborations could help African universities learn from global examples of responsible GenAI implementation.
4. Research on GenAI in higher education should move beyond adoption metrics to examine its influence on teaching identity and assessment design.
5. Curriculum designers can leverage GenAI for active learning and formative assessment, ensuring that human judgment remains central to education.

Keywords

Generative Artificial Intelligence, Higher Education, Academic Integrity, Ethical Challenges, Teaching and Learning.

Introduction

Artificial intelligence (AI) is increasingly shaping higher education, with recent attention focused on generative artificial intelligence (GenAI): tools that produce text, images, code, and other outputs in response to prompts (Rudolph et al., 2024). Applications such as ChatGPT, Gemini, Bard, Claude, and related large language model tools are influencing how students learn, how educators design teaching and assessment, and how academic work is produced and evaluated (Bower et al., 2024; Crawford et al., 2023a). As Generative Artificial Intelligence (GenAI) becomes embedded in university life, the key question is not whether it will enter higher education, but how it is reshaping teaching, learning, assessment, and academic practice.

Globally, Generative Artificial Intelligence (GenAI) has been linked to opportunities for formative feedback, lesson preparation, academic writing support, adaptive learning, idea generation, and study assistance (Apata et al., 2026; Daniel et al., 2025). At the same time, it has intensified concerns about authorship, accuracy, overreliance, and academic integrity (Fitzgerald et al., 2025). These tensions make GenAI a pedagogical as well as technological issue, because its use affects how students demonstrate understanding and how educators exercise judgement in teaching and assessment (Wegerif & Casebourne, 2025).

These questions are especially important in African higher education, where GenAI is entering institutions shaped by unequal digital infrastructure, uneven policy development, and varied institutional capacity (Muzondo et al., 2025; Wainaina & Sun, 2025). Its use differs across countries, institutions, disciplines, and delivery modes, with some studies reporting applications in writing support, teaching assistance, research productivity, and student learning (Omol et al., 2025). In other settings, use is constrained by limited connectivity, inadequate guidance, uneven digital literacy, and uncertainty about responsible practice. GenAI in African higher education therefore needs to be examined in relation to local pedagogical, ethical, infrastructural, and institutional conditions. Reported benefits are promising, particularly for feedback, writing support, lesson planning, multilingual learning, and adaptive support, but much of the evidence remains based on perceptions and exploratory use rather than direct measures of learning outcomes (Pham et al., 2025; Yusuf et al., 2024c).

GenAI also introduces serious pedagogical and ethical concerns, particularly around academic integrity, critical thinking, and student development (Rana et al., 2025). AI-generated content can blur the boundary between assistance and substitution, making it difficult to determine what counts as original work or appropriate support (Hill & Hargis, 2024; Scott, 2024). Routine reliance on GenAI may also reduce opportunities for independent reasoning, creativity, and disciplinary judgement (Apata et al., 2026). These concerns are significant in higher education contexts where teaching aims not only to develop skills but also to foster originality, professional judgement, and socially meaningful learning.

In African higher education, these concerns are compounded by questions of cultural relevance, epistemic justice, and institutional direction (Schoelen et al., 2023). If GenAI tools are adopted without attention to local knowledge systems, linguistic diversity, and educational values, they may reinforce dependence on external technologies and imported models of knowledge production (Guadu et al., 2025). Weak institutional policies, limited faculty development, and uneven digital support further leave educators and students uncertain about responsible use

(Muzondo et al., 2025). Responsible GenAI integration therefore requires attention to pedagogical value, ethical practice, and contextual appropriateness.

Although empirical studies on GenAI in African higher education are growing, the evidence remains fragmented across countries, disciplines, and participant groups (Guadu et al., 2025; Mudenda et al., 2025). Existing studies often focus on isolated issues such as student attitudes, academic integrity, faculty perceptions, or institutional readiness, making it difficult to see what the literature collectively suggests about opportunities, challenges, and preparedness (Chan & Hu, 2023; Crawford et al., 2023a). A focused synthesis is therefore needed to clarify where evidence is concentrated, what educational uses and concerns are most visible, and what this means for responsible pedagogical integration (Bond et al., 2024; McGrath et al., 2024).

This systematic review addresses that gap by synthesising empirical studies on GenAI in African higher education institutions. It examines GenAI as an emerging issue for teaching, learning, assessment, academic integrity, and institutional support. This review is guided by four research questions: how research on GenAI is distributed across African higher education contexts; what opportunities GenAI creates for teaching, learning, assessment, and academic work; what ethical and pedagogical challenges are associated with GenAI use; and how prepared African higher education institutions are to support responsible and sustainable GenAI integration.

Method

Research Design

This study presents a systematic review approach to examine research on GenAI in African HEIs. It adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). This design provides a structured and transparent process for organising both quantitative and qualitative evidence and for offering a comprehensive and in-depth summary of recent work on GenAI in African higher education in response to the targeted research questions.

Participants

No human participants were recruited directly for this systematic review; the review sample consisted of 39 included empirical studies on GenAI in African higher education.

Measures

No participant-level measures were administered; data were extracted using a structured review form and methodological quality was assessed using the Mixed Methods Appraisal Tool (MMAT).

Eligibility Criteria

The eligibility criteria of this review focused on empirical work that examines GenAI in African HEIs. Eligible studies were peer-reviewed journal articles or conference papers published between 2022 and 2025 that investigated the use of GenAI tools such as ChatGPT, Bard, Gemini, LLaMA, or related applications in HEIs across Africa. Studies had to report empirical qualitative, quantitative, or mixed methods findings related to at least one of the review themes: opportunities,

ethical concerns, or institutional preparedness. Only articles published in English and conducted in, or explicitly focused on, African contexts were included. We excluded conceptual or review papers, opinion pieces, book reviews, non-scholarly sources, technical engineering papers without an educational focus, studies outside higher education (for example K–12 or corporate training), and work that addressed only traditional AI rather than GenAI tools. Table 1 summarises the inclusion and exclusion criteria used in the review.

Table 1

Inclusion and Exclusion Criteria for the Systematic Review

S/N	Inclusion criteria	Exclusion criteria
1	Theme: generative artificial intelligence in higher education (for example, ChatGPT, Bard, Gemini, LLaMA, or similar GenAI tools used for teaching, learning, assessment, supervision, or institutional practice)	Any study that does not focus on generative artificial intelligence or that addresses only traditional artificial intelligence, machine learning, or analytics without GenAI tools
2	Context: African higher education institutions (universities, colleges, polytechnics, or teacher education institutions within African countries)	Any study not situated in African higher education, including K to 12 settings, vocational training outside higher education, corporate or community settings, or studies with no clear African focus
3	Study type: empirical research using qualitative, quantitative, or mixed methods and reporting primary data	Conceptual or theoretical papers, literature reviews, commentaries, opinion pieces, book reviews, technical reports, and other sources that are not empirical
4	Publication type and status: peer reviewed and full text available journal articles or full conference papers	Theses, dissertations, unpublished manuscripts, non-peer-reviewed reports, or studies for which the full text was not accessible
5	Year of publication: January 2022 to May 2025	Any study published before 2022
6	Language: English	Any study published in a language other than English

Note. Together, these criteria ensured that the review focused on recent, peer-reviewed empirical studies of GenAI use in African higher education contexts while excluding non-empirical, non-higher education, or non-GenAI studies.

Information Sources

Procedure

We used Boolean operators to identify relevant studies across six databases: Education Source Ultimate, Web of Science, Academic Search Ultimate, Education Resources Information Center (ERIC), PsycINFO, and Humanities Source Ultimate. The final search was conducted on May 27, 2025. The review focused on studies published between January 2022 and May 2025 to capture the recent empirical literature produced during the rapid mainstreaming of publicly accessible GenAI tools in higher education, particularly following the widespread uptake of ChatGPT in late 2022, while acknowledging that GenAI technologies existed before this period. Searches were conducted across title, abstract, and keyword fields where database functionality allowed, with

field settings adapted to the search options available in each database. The geographic component combined continent-level and regional descriptors with selected country names to improve sensitivity for studies that indexed African contexts inconsistently across databases. Broad terms such as Africa, Sub-Saharan Africa, East Africa, West Africa, and North Africa were included to ensure coverage of the continent beyond the individually named countries. The selected country names were used to strengthen search sensitivity rather than to provide an exhaustive list of African countries. The search was limited to peer-reviewed journal articles and conference papers published in English. The full search string and search limits are presented in Table 2.

Table 2

Search Terms and Strategy

Search strategy component	Details
Full search string	(“generative AI” OR “large language models” OR LLMs OR ChatGPT OR Bard OR Gemini OR NotebookLM OR “Consensus app” OR “Meta LLaMA” OR “language models” OR “AI-generated content” OR “natural language generation” OR “text generation”) AND (“higher education” OR “tertiary education” OR universities OR “college students” OR “postsecondary education” OR “academic institutions”) AND (Africa OR “Sub-Saharan Africa” OR “East Africa” OR “West Africa” OR “North Africa” OR Nigeria OR Ghana OR Kenya OR “South Africa” OR Ethiopia OR Uganda OR Tanzania OR Egypt OR Senegal OR Rwanda OR Botswana) AND (opportunities OR benefits OR impact OR “use cases” OR ethics OR “academic integrity” OR plagiarism OR “AI misuse” OR policy OR infrastructure OR training OR “faculty readiness” OR “AI governance”)
Search limits	Peer-reviewed journal articles and conference papers; English language; January 2022 to May 2025
Databases searched	Education Source Ultimate, Web of Science, Academic Search Ultimate, ERIC, PsycINFO, and Humanities Source Ultimate

Note. Overall, this search strategy was designed to balance breadth and specificity by combining GenAI-related terms, higher education terms, African geographic descriptors, and review-theme terms within defined database, language, and publication-date limits.

Study Selection

The flow of the study selection process is illustrated in Figure 1. The initial search across six databases generated 110 records. After importing the records into Covidence, 28 duplicates were removed, leaving 82 unique records for title and abstract screening. At this stage, 31 records were excluded because they clearly fell outside the scope of the review, most often because they did not address generative AI tools, did not focus on higher education, or were not situated in African contexts.

The remaining 51 records were retrieved in full and assessed against the predefined inclusion and exclusion criteria. During full text screening, 12 reports were excluded for specific reasons. Five studies did not examine generative AI applications, three were conceptual or commentary pieces without empirical data, two could not be assessed because the full text was not available, one did not focus on higher education, and one was not written in English. After all inclusion and

exclusion criteria were applied, 39 studies were retained for the systematic review and constituted the final dataset.

Inter-Rater Reliability

To ensure consistency and transparency in the article selection process, we assessed interrater reliability during the full-text screening stage. Two reviewers independently screened all 51 full-text articles in Covidence using the predefined inclusion and exclusion criteria. The reviewers agreed on 50 of the 51 decisions, resulting in a proportionate agreement of .98. Covidence automatically calculated Cohen's kappa (κ), which yielded a value of .94, indicating very strong agreement according to commonly used benchmarks (Landis & Koch, 1977; Lombard et al., 2002). These results demonstrate the rigor and consistency of the screening process and support the methodological transparency of the review.

Data Collection Process and Data Items

A three-member review team extracted data from the 39 included studies using a structured form. The form recorded bibliographic information (year of publication and African country or countries), institutional and disciplinary context, participant group, research design and methods, sample size, the generative AI tool or tools examined, and the focus of the study. We also documented key findings related to three review themes: opportunities and benefits of generative AI in higher education, ethical and academic integrity concerns, and institutional readiness or support for GenAI integration. Two reviewers completed the initial extraction for all studies, and the third reviewer checked the completed table for consistency and completeness.

Google NotebookLM was used only as an assistive tool to organise article-level notes and generate provisional summaries of study aims, methods, and findings. These summaries were checked against the full text of each included study and corrected where necessary. Final extraction, coding, thematic grouping, and interpretation were conducted by the reviewers rather than by the AI tool.

Quality Appraisal

Two reviewers independently appraised each study according to its methodological design category: qualitative, quantitative descriptive, mixed methods, or experimental design where relevant. The two MMAT screening questions were first applied to all studies, after which the relevant design-specific criteria were assessed. Disagreements between reviewers were resolved through discussion, and final consensus ratings were recorded. The appraisal was used to identify the methodological strengths and limitations of the evidence base and to inform interpretation of the synthesis rather than to exclude studies from the review. A study-level summary of the MMAT appraisal is integrated into Supplementary Table A1.

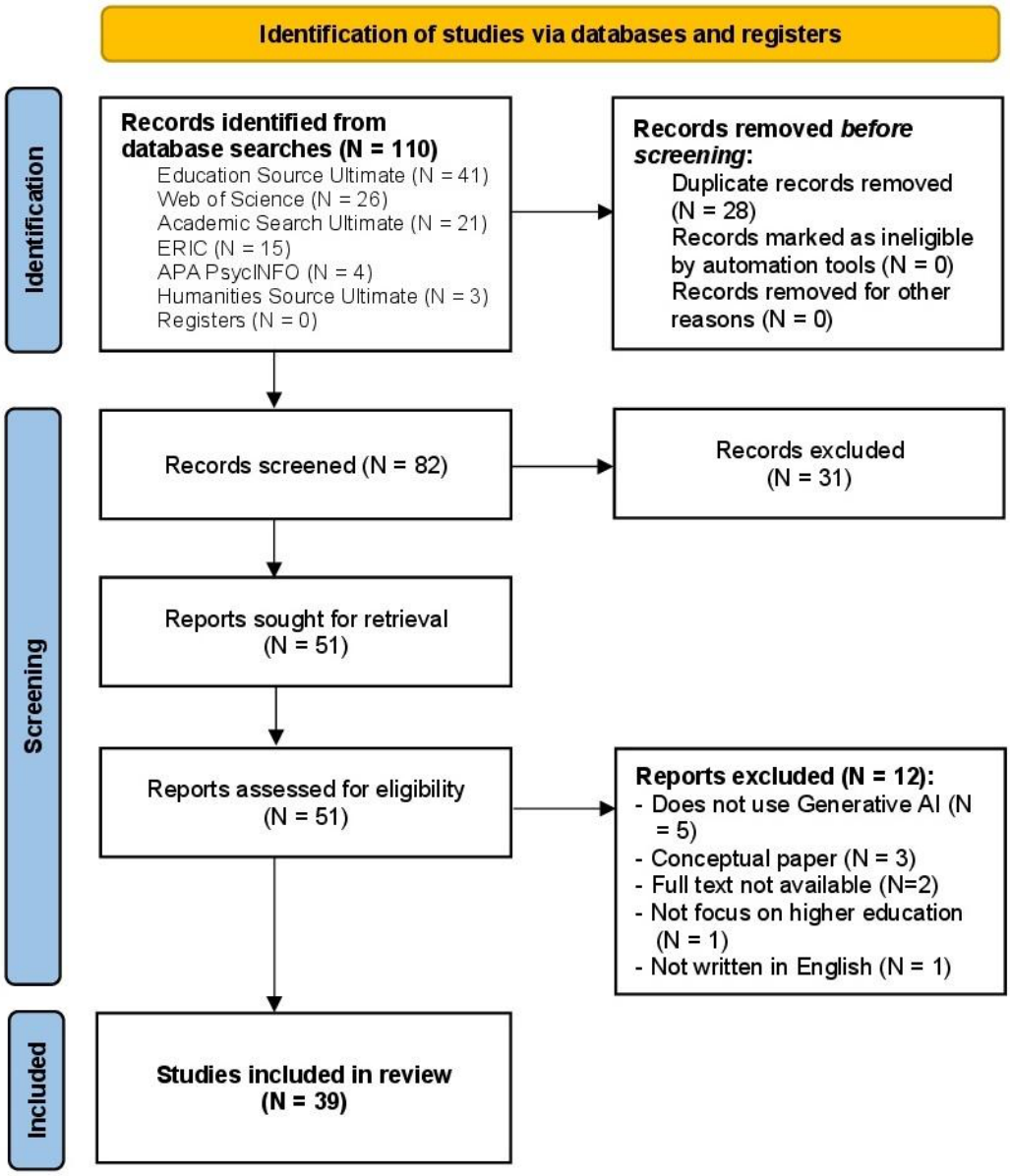
Analysis

We used a thematic synthesis approach to analyse the findings from the 39 included studies. Study information was organised into an extraction matrix containing bibliographic details, country, participant group or context, study design, GenAI tool or tools examined, and key findings relevant to the review questions. The synthesis combined deductive and inductive procedures. Deductively, findings were first grouped according to the four review questions. Inductively,

recurring ideas, patterns, and contrasts within each group were then identified from the extracted data. Two reviewers compared preliminary codes and resolved differences through discussion until consensus was reached. Related codes were subsequently clustered into broader themes, which were refined iteratively and used to structure the narrative synthesis presented in the Results. Throughout the synthesis, attention was given to differences in study design and evidence type so that perception-based findings were interpreted more cautiously than direct evidence of educational outcomes.

Figure 1

PRISMA flow diagram illustrating the identification, screening, eligibility, and inclusion of studies.



Source: "PRISMA 2020 flow diagram for new systematic reviews that included searches of databases, registers, and other sources," by Page et al. 2021, PRISMA Statement. https://doi.org/10.1136/bmj.n71

Note. The included-study dataset was limited to empirical studies published from January 2022 to May 2025; later or broader sources cited in the introduction and discussion were used only for contextual framing.

Study Characteristics

Supplementary Table A1 summarises the characteristics and methodological appraisal of the 39 included studies. The table presents each study's country, design/MMAT category, participant context, sample, GenAI tool(s), and MMAT appraisal summary. GenAI tools were defined as AI or AI-enabled platforms capable of generating, rewriting, summarising, translating, or supporting new content creation. For multi-country studies, only African countries were recorded. The 39 included studies represented a heterogeneous body of evidence. Common focal areas included student use and perceptions of GenAI, faculty perceptions and practices, academic integrity concerns, teaching and learning support, institutional readiness and policy, and discipline-specific applications. The studies also varied by educational context, including general university settings, health professions education, Open Distance eLearning environments, and multi-country investigations. This heterogeneity was considered throughout the synthesis to avoid conflating distinct forms of evidence and context.

Results

Methodological Quality of Included Studies

All 39 included studies underwent methodological quality appraisal using MMAT. This comprised 11 qualitative studies, 20 quantitative descriptive studies, seven mixed methods studies, and one randomized controlled trial. Across all studies, the two MMAT screening questions were met, indicating that the studies generally had clear research questions and relevant data sources. Qualitative studies showed the strongest profile overall, with most meeting all five design specific criteria. Quantitative descriptive studies demonstrated recurring weaknesses in sample representativeness and non response bias, despite generally appropriate sampling strategies, measurements, and statistical analyses. Mixed methods studies typically provided a clear rationale for using mixed methods and showed some degree of integration, but they rarely addressed divergences or inconsistencies between qualitative and quantitative findings. The single randomized controlled trial demonstrated some strengths but also had several unclear areas in reporting. In all, the evidence base was methodologically uneven, and these limitations were considered when interpreting findings related to pedagogical opportunities, ethical concerns, and institutional readiness. Detailed study characteristics and methodological appraisal outcomes are provided in Supplementary Table A1.

Rq1. Geographic Distribution of Research on GenAI in African Higher Education

The first research question examined how GenAI research is distributed across African higher education contexts. As shown in Table 3, the evidence base is geographically uneven. The 39 included studies produced 49 country-level instances because several studies involved more than one African country. Most were concentrated in South Africa (n=15), Egypt (n=11), Nigeria (n=10), and Ghana (n=4), with limited representation from Tanzania (n=3), Uganda (n=2), Botswana, Burkina Faso, Kenya, and Sudan (each n=1).

The concentration of studies in South Africa, Egypt, and Nigeria suggests that the current evidence base reflects a relatively narrow range of national and disciplinary contexts. South African studies addressed a comparatively broad range of issues, including academic writing, Open Distance eLearning, teaching practice, research productivity, and policy-related concerns

(Adewale, 2024; Combrinck, 2024; Sevnarayan, 2024). Egyptian studies were more concentrated in health sciences, student attitudes, and technology adoption, often through large-scale or multinational surveys (Abdaljaleel et al., 2024; Abdelhafiz et al., 2025; Eldakar et al., 2025; Sallam et al., 2025). Nigerian studies similarly focused on student adoption, academic integrity, medical education, and behavioural intention to use AI tools (Ojo, 2024; Oluwadiya et al., 2023; Yakubu et al., 2025).

Studies from less-represented countries highlighted emerging adoption alongside ongoing infrastructural constraints. Research from Ghana, Uganda, Tanzania, and Botswana reported awareness and exploratory use of GenAI alongside barriers such as limited access to devices, high internet costs, uneven digital literacy, and insufficient institutional support (Baidoo-Anu et al., 2024; Indrawati et al., 2025; Komba, 2024; Namatovu & Kyambade, 2025; Segbenya et al., 2024). These studies help broaden the evidence base, but their limited number means they should be interpreted as indicative rather than representative of wider national or regional patterns. Overall, the geographic distribution of the reviewed studies points to an uneven evidence base, with a small number of countries contributing most of the published research and several African contexts remaining underrepresented. This pattern should be interpreted as evidence of where published research is concentrated rather than as a measure of continent-wide GenAI adoption or readiness.

Table 3

Geographic Distribution of Studies on Generative AI in African Higher Education

S/N	Country	Frequencies
1	Botswana	1
2	Burkina Faso	1
3	Egypt	11
4	Ghana	4
5	Kenya	1
6	Nigeria	10
7	South Africa	15
8	Sudan	1
9	Tanzania	3
10	Uganda	2
	Total	49

Note. Table 3 shows that the reviewed evidence was concentrated mainly in South Africa, Egypt, and Nigeria, indicating that published research on GenAI in African higher education remains unevenly distributed across the continent.

Rq2. Pedagogical and Institutional Opportunities Created by GenAI in African Higher Education

The reviewed studies identify several reported opportunities for GenAI in African higher education, particularly in teaching support, personalised learning, academic writing, curriculum development, and research-related tasks (Abdaljaleel et al., 2024; Aggarwal et al., 2025; Ravšelj et al., 2025; Segbenya et al., 2024). These findings suggest that GenAI is being explored not only as a student-

facing learning support tool but also as a resource for academic and institutional work. However, these opportunities were most often described through self-reported perceptions and exploratory use, so the findings should be read as evidence of perceived usefulness rather than confirmed improvements in learning outcomes.

At the pedagogical level, GenAI was most frequently associated with personalised and differentiated learning support. Studies reported that tools such as ChatGPT could assist with feedback, interactivity, lesson preparation, academic writing, grammar correction, paraphrasing, and support for students in Open Distance eLearning contexts (Maphoto et al., 2024; Mohlake & Mohale, 2024; Mutanga et al., 2024; Sevnarayan, 2024; van den Berg & du Plessis, 2023; van Wyk et al., 2023). These uses may be especially valuable where class sizes are large, feedback capacity is limited, or students require additional writing and language support. However, the reviewed studies generally emphasised potential and perceived usefulness rather than direct evidence of improved achievement or retention.

At the institutional level, GenAI was reported to support routine teaching and academic work, including quiz generation, course-outline drafting, assessment-question design, information retrieval, course-material searches, and plagiarism checking (Pramjeeth & Ramgovind, 2024; Segbenya et al., 2024). These findings suggest that GenAI may help improve efficiency in selected teaching and curriculum tasks, while also reinforcing the need to embed AI, data, and human literacies into curriculum design so students are prepared for AI-mediated workplaces.

For research and postgraduate study, GenAI was reported to support literature searching, idea generation, summarising, drafting, editing, paraphrasing, and selected data-analysis tasks (Adewale, 2024; Chauke et al., 2024; Combrinck, 2024; Ringo, 2025). These uses may reduce time spent on routine research processes and support academics and postgraduate students working in resource-constrained environments. Collectively, the evidence suggests that GenAI can support a range of academic and instructional tasks, but the strength of this conclusion remains limited by the predominance of descriptive and perception-based studies.

Rq3. Ethical and Pedagogical Challenges of GenAI in African Higher Education

The reviewed studies identify three recurring ethical and pedagogical challenges associated with GenAI use in African higher education: academic integrity risks, student overreliance, and concerns about the reliability and governance of AI-generated outputs. These challenges directly affect assessment, student development, and institutional responsibility in African higher education (Abdaljaleel et al., 2024; Ivanov et al., 2024). Although GenAI tools offer innovation and efficiency, their unregulated use has amplified ethical dilemmas and pedagogical tensions, including academic misconduct, the possible erosion of essential cognitive skills, and limitations inherent in the technology itself (Abdaljaleel et al., 2024; Eldakar et al., 2025; Ivanov et al., 2024; Sevnarayan, 2024).

Academic integrity was the most prominent concern. GenAI tools can produce polished, human-like text that blurs the boundary between original and machine-generated work, creating risks of plagiarism, contract-cheating-like behaviour, and unfairness in assessment (Abdelhafiz et al., 2025; Ivanov et al., 2024; Maphoto et al., 2024; Ofem et al., 2024). These risks were especially salient in online and distance education contexts, where verifying authentic student engagement is already challenging (Maphoto et al., 2024; Sevnarayan, 2024). Multinational evidence also

suggests that concerns about academic integrity are widespread across the reviewed contexts (Yusuf et al., 2024b).

A second concern was overreliance on GenAI and its possible effects on student learning. Several studies reported that frequent dependence on AI tools may reduce opportunities for independent reasoning, creativity, critical thinking, and disciplinary judgement (Ahmad et al., 2024; Ivanov et al., 2024; Maphoto et al., 2024; Mutanga et al., 2024; Ojo, 2024; Ravšelj et al., 2025). Evidence from Nigerian higher education also suggests that while GenAI may support technical writing, it is less reliable for developing coherent argumentation and structural organisation (Ya'u & Mohammed, 2025). These findings point to the need to teach students how to evaluate, adapt, and question AI-generated content rather than use it as a substitute for learning.

A third challenge concerns the limitations of GenAI systems themselves. Studies highlighted risks of inaccurate, superficial, or misleading outputs, alongside concerns about bias, privacy, transparency, and unequal access (Abdaljaleel et al., 2024; Adewale, 2024; Eldakar et al., 2025; Ivanov et al., 2024; Pramjeeth & Ramgovind, 2024; Yusuf et al., 2024a). In professional education, particularly health-related fields, these concerns extend to human judgement, empathy, and ethical decision-making, with Nigerian medical education research reporting apprehension about AI's potential to dehumanise care and weaken clinical reasoning (Oluwadiya et al., 2023). Collectively, the findings suggest that GenAI should be positioned as a tool for critical analysis and reflection rather than as an unchecked generator of academic or professional judgement.

Rq4. Institutional Readiness for Responsible and Sustainable GenAI Integration in African Higher Education

The reviewed literature suggests that institutional readiness for responsible and sustainable GenAI integration in African higher education remains uneven and often limited. In this study, institutional readiness was most often discussed in relation to policy uncertainty, infrastructural constraints, and limited faculty development. These findings suggest that institutional readiness is still emerging and should not be interpreted as a uniform condition across African higher education institutions.

Across the reviewed studies, the absence of formal institutional policies and ethical guidelines was frequently identified as a barrier to readiness. Many universities have yet to establish clear frameworks to guide the responsible use of GenAI in teaching, learning, and assessment (Mahfouz & AbdelMohsen, 2025; Venter et al., 2024). The lack of institutional clarity leaves lecturers and students uncertain about acceptable boundaries and ethical practices. Following the sudden introduction of tools like ChatGPT, several lecturers expressed a "palpable sense of helplessness" regarding how to address excessive student dependence on AI during online assessments (Maphoto et al., 2024, p. 146). Researchers argue that institutional policies must move beyond a "one size-fits-all" approach (Pramjeeth & Ramgovind, 2024, p. 1) and instead reflect contextual realities, including cultural expectations and disciplinary norms (Yusuf et al., 2024b). Evidence from a South African private HEI emphasises the urgent need for detailed policies outlining ethical standards, user responsibilities, and consequences for misuse (Pramjeeth & Ramgovind, 2024). Interestingly, students themselves have expressed support for such regulations, noting that formal institutional policies are essential to ensure fairness and accountability in GenAI use (Yusuf et al., 2024b).

Beyond policy concerns, the sustainability of GenAI adoption is constrained by persistent infrastructural and resource inequalities. Studies described limited digital infrastructure as a continuing constraint that may widen disparities between better-resourced and under-resourced institutions. For example, a study conducted in Uganda identified obstacles such as “limited access to technological resources, varying levels of digital literacy, and infrastructural constraints” (Namatovu & Kyambade, 2025, p. 2). A study conducted by researchers in Botswana reported similar challenges, particularly insufficient IT support and unequal access to technology in rural regions (Indrawati et al., 2025). High internet costs and the price of premium AI subscriptions further deepen disparities, raising fears that GenAI could amplify “existing inequalities for students and academics who cannot afford to pay for access to better AI versions” (Combrinck, 2024, p. 5). To mitigate these inequities, scholars recommend that institutions provide universal access through shared or institutional accounts, ensuring that “GenAI technologies are available to all lecturers and students to ensure their competitiveness and employability” (Ivanov et al., 2024, p. 10).

A further recurring issue in the literature was the limited availability of structured faculty professional development on the use of GenAI. Despite growing enthusiasm for AI-enhanced teaching, most professors report limited training opportunities and a lack of institutional support for skill development (Aggarwal et al., 2025). A multinational study involving Ghana, Nigeria, South Africa, and Uganda found that the presence of AI tools “does not directly translate into the productivity of academics” (Segbenya et al., 2024, p. 1), emphasising the importance of competence and confidence in their use. Lecturers in Nigerian universities, for instance, demonstrated “a low level of attitude and poor perception in exploring the potential of ChatGPT for instructional assessment” (Opesemowo et al., 2024, p. 10). While this may partly reflect limited exposure and insufficient training, the findings also suggest that disciplinary expectations, concerns about fairness, and the perceived effort required to review AI-assisted work may influence how faculty engage with GenAI in assessment contexts. Similarly, research in the Nigerian medical education context revealed that only a small fraction of students and lecturers had received any form of AI training, most of which was self-initiated rather than institutionally organised (Oluwadiya et al., 2023). To address these limitations, scholars consistently recommend comprehensive capacity-building programs focused on both the technical and ethical dimensions of GenAI. Such initiatives should develop faculty and student competencies in digital literacy, responsible use, and critical evaluation of AI outputs (Pramjeeth & Ramgovind, 2024; Ringo, 2025; Sevnarayan, 2024).

Collectively, the reviewed studies suggest that GenAI adoption in African higher education is marked by both promise and constraint. The evidence remains uneven across contexts and themes, so broader conclusions about institutional readiness should be interpreted cautiously. The next section discusses these findings in relation to existing theoretical frameworks and broader implications for policy and pedagogy.

Discussion

Interpretation of Findings

This systematic review examined how GenAI is being studied and used in African higher education and what this indicates for teaching, learning, assessment, and institutional readiness.

The findings show an uneven evidence base: published research and reported adoption are concentrated in a small number of countries, particularly South Africa, Nigeria, and Egypt, while many African contexts remain underrepresented (Chauke et al., 2024; Oluwadiya et al., 2023; Sallam et al., 2025). This pattern reflects broader differences in research capacity, infrastructure, funding, and digital-policy development rather than continent-wide readiness or adoption (Zlotnikova & Hlomani, 2025).

Theoretical Implications

These findings also align with wider patterns of unequal technology diffusion. Institutions with stronger partnerships, research networks, and digital resources are better positioned to experiment with GenAI, while others remain constrained by limited investment and policy support (Essien et al., 2024; Ya'u & Mohammed, 2025). Interpreted through Rogers' (2003) diffusion of innovation model, GenAI uptake in African higher education appears to be at an early and uneven stage, with a small number of institutions acting as innovation hubs and others positioned at the margins. At present, GenAI is more commonly reported as a support tool for writing, feedback, teaching preparation, and research tasks than as a fully embedded driver of pedagogical redesign.

The pedagogical findings suggest promise, but also caution. Educators and students reported using GenAI for formative assessment, personalised feedback, adaptive support, academic writing, and research-related tasks (Abdaljaleel et al., 2024; Indrawati et al., 2025; Venter et al., 2025). These uses may help address persistent challenges such as large classes, limited feedback capacity, and distance learning constraints. However, most evidence remains based on self-reported perceptions and descriptive studies rather than direct measures of learning outcomes or teaching effectiveness. This means the strongest claim supported by the available literature is that GenAI is perceived as useful in selected educational tasks, not that it has yet produced demonstrable improvements in learning across African higher education.

The reviewed literature also shows that GenAI use often remains exploratory and informally supported. Many educators are experimenting with tools such as ChatGPT and Grammarly without clear pedagogical frameworks, institutional guidance, or sustained professional development (Abdaljaleel et al., 2024; Aggarwal et al., 2025; Eldakar et al., 2025). This reinforces the need for professional learning that connects technical capability with assessment design, academic integrity, and contextually relevant teaching practice (Ajose et al., 2026).

Ethical and governance concerns were equally prominent. Academic integrity, authorship, plagiarism, reliability, privacy, and bias appeared repeatedly across the reviewed studies (Mutanga et al., 2024; Sallam et al., 2025). These concerns echo global debates about the blurred boundaries between human and AI-generated work (Mortlock & Lucas, 2024), but they are intensified where institutional policies and national frameworks remain underdeveloped (Mahfouz & AbdelMohsen, 2025; Yakubu et al., 2025). Without clear expectations, educators and students are left to negotiate acceptable use through ad hoc practices, increasing inconsistency across courses and institutions.

Institutional readiness therefore emerges as a central condition for responsible GenAI integration. Across the reviewed studies, GenAI use appeared more systematic where digital strategies, leadership commitment, stable funding, faculty development, and policy guidance were present.

Where these enablers were limited, GenAI was more often described through isolated experiments, informal practices, or early-stage initiatives. This highlights the need for African universities to move from reactive responses toward long-term governance, infrastructure, and capability-building strategies that embed GenAI within broader digital transformation agendas (Huo & Siau, 2024; Zlotnikova & Hlomani, 2025).

Finally, GenAI adoption in African higher education should be understood not only as technological change but also as a question of knowledge production. AI use in writing, assessment, and research challenges assumptions about authorship, originality, and whose knowledge is valued. In postcolonial academic settings, responsible integration must therefore attend to local knowledge systems, linguistic diversity, and African pedagogical values rather than reproducing imported models of education (Singh, 2023).

Practical Implications

The findings have several important implications for teaching and learning practice in higher education. First, GenAI appears to offer new possibilities for inclusive and multilingual education. In contexts with diverse linguistic and cultural backgrounds, GenAI's capacity to generate adaptive and multilingual learning materials can foster more equitable participation (Abdaljaleel et al., 2024). This finding is consistent with studies from Europe and Asia showing that AI-driven translation and personalisation tools can enhance accessibility and engagement (Osorio et al., 2024). For African universities, this means GenAI could serve as a strategic resource for implementing inclusive education policies aligned with the African Union's Agenda 2063 and the United Nations' Sustainable Development Goal four on quality education (African Union Commission, 2015; United Nations, 2015; Apata et al., 2026).

Second, professional development for academic staff is important. Despite growing interest, the review found limited evidence of structured training programs that equip educators with the pedagogical and ethical competencies to use GenAI effectively (Pramjeeth & Ramgovind, 2024). The work of Chaaban et al. (2024) similarly emphasises that AI readiness requires not only technological skill but also critical awareness of knowledge-based and cultural implications. Universities must therefore institutionalise professional learning programs where educators collaboratively explore AI-enhanced pedagogies and share good practices (Apata et al., 2025).

Third, integrating AI literacy into curricula is increasingly important. Students should be empowered to use GenAI responsibly, understanding its affordances and limitations. As noted by Xia and Weng (2024), GenAI can either enhance or erode learning depending on how students engage with it. Therefore, AI literacy should extend beyond technical proficiency to include ethical reasoning, data literacy, and critical thinking. Embedding such competencies in curriculum design would ensure that graduates are prepared to navigate an AI-driven world responsibly and creatively.

Finally, the ethical integration of GenAI will require adaptive institutional governance. Policies must articulate clear principles for transparency, data privacy, and accountability while allowing flexibility to accommodate local contexts (Apata et al., 2026). African universities can adopt hybrid governance models that balance global ethical standards with indigenous knowledge systems and pedagogical traditions (Feyijimi et al., 2026; Zlotnikova & Hlomani, 2024). Such localised

ethical frameworks would promote culturally sensitive and contextually appropriate uses of GenAI in education.

Limitations and Future Research

This review has some limitations. First, it only includes peer-reviewed journal articles and full conference papers written in English between 2022 and May 2025, so relevant work in other languages, grey literature, and earlier exploratory studies may be missing. Second, the search was limited to six databases, which means scholarship stored in regional African databases or institutional repositories may not be fully represented. Third, the evidence is uneven across countries, with South Africa, Egypt, Nigeria, and Ghana appearing most often. As a result, it is difficult to generalise the findings to under-researched systems in Central and Francophone Africa. In addition, findings on institutional readiness should be interpreted cautiously because much of the evidence was drawn from descriptive, perception-based, and context-specific studies rather than direct institutional audits or nationally representative assessments. Therefore, the review should not be read as a uniform assessment of all African higher education institutions, but as a synthesis of how readiness has been reported in the available literature.

Future work can build on this review in several ways. Longitudinal and intervention studies are needed to show how GenAI shapes learning, academic integrity, research practice, and assessment over time. We recommend multi-country collaborations, which will show how different governance models, funding patterns, and infrastructure support GenAI use. There is room for richer case studies and participatory work that involve students, lecturers, and policymakers in co-designing African GenAI frameworks.

Conclusion

This review examined how GenAI is currently being studied and used in African HEIs, drawing on 39 empirical studies published between 2022 and May 2025. Across these studies, GenAI is presented as a tool with real promise for widening access to feedback, supporting multilingual learning, and easing some of the everyday pressures on students and faculty. At the same time, the evidence points to serious concerns about academic integrity, uneven digital access, and limited institutional readiness. These conclusions should be interpreted with caution, as the evidence base remains methodologically uneven and is dominated by descriptive and perception-based studies. This uneven distribution of research activity and adoption, concentrated in a small group of countries and institutions, mirrors broader inequalities in research capacity and infrastructure across the continent.

The findings suggest that GenAI will not transform African higher education on its own. Its contribution depends on how universities, departments, and individual educators choose to integrate it into teaching, learning, and assessment. Clear policies, reliable infrastructure, and sustained professional development will be essential if GenAI is to support rather than erode educational quality and academic honesty. As African scholars and institutions continue to experiment with GenAI, they have an important opportunity to shape global conversations about responsible AI in ways that reflect African pedagogical values, social priorities, and visions of just and inclusive higher education.

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Appendix A

Supplementary Table A1

Characteristics and Methodological Appraisal of Included Studies

Study	Country	Design/MMAT category	Participant/context	Sample	GenAI tool(s)	MMAT appraisal summary
Abdaljaleel et al. (2024)	Egypt	Quantitative descriptive	University students	2,240	ChatGPT	Met three/5 criteria; sample not representative; nonresponse bias unclear.
Abdelhafiz et al. (2025)	Egypt	Quantitative descriptive	Undergraduate medical students	614	ChatGPT	Met four/5 criteria; sample not representative.
Adewale (2024)	South Africa	Qualitative	Female academics and researchers	20	ChatGPT	Met five/5 criteria.
Aggarwal et al. (2025)	Ghana; South Africa	Quantitative descriptive	Academicians in audiology and speech-language therapy	106	ChatGPT; Canva; Grammarly; QuillBot	Met three/5 criteria; sample not representative; nonresponse bias not addressed.
Ahmad et al. (2024)	Egypt; Sudan	Quantitative descriptive	Higher education staff and students	815	ChatGPT; Bard AI; Bing AI; Chatsonic; Writesonic; OpenAI Playground; Claude; Socratic; Jasper; Falcon LLM; LaMDA2	Met three/5 criteria; sample not representative; nonresponse bias unclear.
Baidoo-Anu et al. (2024)	Ghana	Quantitative descriptive	Ghanaian higher education students	277	ChatGPT	Met three/5 criteria; sample not representative; nonresponse bias not addressed.
Chauke et al. (2024)	South Africa	Qualitative	Postgraduate master's students	10	ChatGPT	Met five/5 criteria.
Combrinck (2024)	South Africa	Mixed methods	Engineering students	969 (quantitative); 14 (qualitative)	ChatGPT; Julius AI	Met three/5 criteria; divergence/inconsistency and component-quality adherence unclear.
Daha and Altelwany (2025)	Egypt	Quantitative descriptive	Undergraduate and postgraduate students	527	ChatGPT	Met three/5 criteria; sample not representative; nonresponse bias unclear.
Eldakar et al. (2025)	Egypt	Quantitative descriptive	Academic researchers	742	ChatGPT; Gemini	Met three/5 criteria; sample not representative; nonresponse bias unclear.
Essien et al. (2024)	Nigeria	Quantitative descriptive	Students across 17 universities	899	ChatGPT	Met three/5 criteria; sample not representative; nonresponse bias unclear.

Study	Country	Design/MMAT category	Participant/context	Sample	GenAI tool(s)	MMAT appraisal summary
Hidayat-ur-Rehman and Ibrahim (2024)	Egypt	Mixed methods	Faculty members	17 (Study 1); 243 (Study 2)	ChatGPT	Met three/5 criteria; divergence/inconsistency not addressed; component-quality criteria not fully met.
Indrawati et al. (2025)	Botswana	Quantitative descriptive	Students, educators, and administrators	518	ChatGPT	Met three/5 criteria; sample not representative; nonresponse bias unclear.
Ivanov et al. (2024)	Egypt	Quantitative descriptive	Lecturers and students	298	ChatGPT	Met three/5 criteria; sample not representative; nonresponse bias unclear.
Komba (2024)	Tanzania	Qualitative	University students	15	ChatGPT	Met five/5 criteria.
Mahfouz and AbdelMohsen (2025)	Egypt	Quantitative descriptive	University-level students	521	ChatGPT	Met three/5 criteria; sample not representative; nonresponse bias unclear.
Maphoto et al. (2024)	South Africa	Qualitative	Lecturers, students, and markers	12 lecturers; 12 students; 10 markers	ChatGPT; DWAs/APTs/AWE	Met five/5 criteria.
Mohlake and Mohale (2024)	South Africa	Qualitative	Student language consultants	44	ChatGPT	Met two/5 criteria; qualitative approach, data collection, and overall coherence unclear or inadequately described.
Mutanga et al. (2024)	South Africa	Qualitative	Lecturers	25	ChatGPT	Met five/5 criteria.
Namatovu and Kyambade (2025)	Uganda	Mixed methods	Students	473 (survey); 18 (interviews)	ChatGPT	Met four/5 criteria; divergence/inconsistency not addressed.
Ofem et al. (2024)	Nigeria	Quantitative descriptive	Students	4,504	ChatGPT	Met three/5 criteria; sample not representative; nonresponse bias unclear.
Ojo (2024)	Nigeria	Quantitative descriptive	Undergraduate students	268	ChatGPT	Met three/5 criteria; sample not representative; nonresponse bias unclear.
Oluwadiya et al. (2023)	Nigeria	Quantitative descriptive	Medical students and lecturers	1,003	ChatGPT	Met five/5 criteria.

Study	Country	Design/MMAT category	Participant/context	Sample	GenAI tool(s)	MMAT appraisal summary
Opesemowo et al. (2024)	Nigeria	Quantitative descriptive	Lecturers	102	ChatGPT	Met three/5 criteria; sample not representative; nonresponse bias unclear.
Pramjeeth and Ramgovind (2024)	South Africa	Qualitative	Academics and teaching-and-learning specialists	59	ChatGPT; Copilot; Midjourney; DALL-E	Met five/5 criteria.
Ravšelj et al. (2025)	Egypt; Tanzania; Ghana	Quantitative descriptive	Higher education students	23,218	ChatGPT	Met three/5 criteria; sample not representative; nonresponse bias unclear.
Ringo (2025)	Tanzania	Quantitative descriptive	Doctoral students	215	ChatGPT	Met four/5 criteria; sample not representative.
Sallam et al. (2025)	Egypt	Quantitative descriptive	Health sciences students	587	ChatGPT	Met three/5 criteria; sample not representative; nonresponse bias unclear.
Segbenya et al. (2024)	Ghana; Nigeria; South Africa; Uganda	Mixed methods	Academics	665	ChatGPT; QuillBot	Met two/5 criteria; integration unclear; divergence/inconsistency not addressed; component-quality criteria not fully met.
Sevnarayan (2024)	South Africa	Qualitative	First-year students and lecturers	19 students; five lecturers	ChatGPT	Met five/5 criteria.
Singh (2023)	South Africa	Qualitative	Professors	3	ChatGPT	Met four/5 criteria; overall coherence unclear.
van den Berg & du Plessis (2023)	South Africa	Qualitative	Document analysis	One primary ChatGPT-generated lesson plan	ChatGPT	Met five/5 criteria.
van Wyk et al. (2023)	South Africa	Qualitative	Academics	13	ChatGPT	Met four/5 criteria; overall coherence unclear.
Venter et al. (2025)	South Africa	Mixed methods	Academic staff	144	ChatGPT; Claude; Gemini; Copilot	Met three/5 criteria; divergence/inconsistency and component-quality adherence unclear.
Venter et al. (2024)	South Africa	Mixed methods	Academics	140	ChatGPT	Met three/5 criteria; divergence/inconsistency not addressed; component-quality criteria not fully met.

Study	Country	Design/MMAT category	Participant/context	Sample	GenAI tool(s)	MMAT appraisal summary
Ya'u and Mohammed (2025)	Nigeria	Quantitative descriptive	Undergraduate students	350	Grammarly; QuillBot	Met three/5 criteria; sample not representative; nonresponse bias unclear.
Yakubu et al. (2025)	Nigeria	Quantitative descriptive	Computer science students	289	ChatGPT; Gemini	Met four/5 criteria; sample not representative.
Yusuf et al. (2024a)	Nigeria	Pretest-posttest experimental design (RCT appraisal)	Students (postgraduate students stated for Study 1)	Study one: 179; Study two: 125	ChatGPT	Met two/5 criteria; randomization, outcome completeness, and intervention adherence unclear.
Yusuf et al. (2024b)	Nigeria; Egypt; Kenya; Burkina Faso	Mixed methods	Students and lecturers	1,217	ChatGPT; GrammarlyGo; Bard; DALL-E; JukeBox; Synthesia; Stable Diffusion; MidJourney; ChatSonic; YouChat	Met four/5 criteria; divergence/inconsistency not addressed.

Note. MMAT = Mixed Methods Appraisal Tool; AI = artificial intelligence; GenAI = generative artificial intelligence; ChatGPT = Chat Generative Pre-trained Transformer; DWA = digital writing assistant; APT = automated paraphrasing tool; AWE = automated writing evaluation; LLM = large language model; LaMDA = Language Model for Dialogue Applications. DALL·E is OpenAI's image-generation model, not an acronym. GenAI tools were defined as AI or AI-enabled platforms capable of generating, rewriting, summarising, translating, or otherwise supporting new content creation. For multi-country studies, only African countries were recorde