Journal of Education Management and Leadership

[ISSN 2958-1109]
Volume: 05 Issue: 01 | February-2026

JEML

Generative AI for Teacher Education: Ethical Considerations from the Perspective of Lecturers and Students

Authors
Adjei Amaniampong [(1)]; William Kwabena Nantwi [(2)]
Main author's email: amass18@yahoo.com

(1.2) Offinso College of Education, Ghana.

Cite this article in APA
Amaniampong, A., & Nantwi, W. K. (2026). Generative AI for teacher education: Ethical considerations from the perspective of lecturers and students. *Journal of education management and leadership, 5*(1), 37-51. https://doi.org/10.51317/jeml.v5i1.905

OPEN ACCESS
A publication of Editon Consortium Publishing (online)

Article history
Received: 2025-12-22
Accepted: 2026-01-17
Published: 2026-02-20

Scan this QR to read the paper online

Abstract
The purpose of this study is to examine the ethical implications of integrating generative artificial intelligence (AI) tools into teacher education in Ghana from the perspectives of lecturers and teacher trainees. Although generative AI technologies are increasingly adopted in education globally, empirical evidence on their ethical dimensions within sub-Saharan African teacher education contexts remains limited. This research used a qualitative descriptive approach, engaging 15 lecturers and 50 teacher trainees from three public Colleges of Education located in Ghana's Ashanti Region. Data were gathered via semi-structured interviews and open-ended questionnaires, and analysed using thematic methods. The findings revealed key ethical concerns related to academic integrity, data privacy, pedagogical dependency, equity of access, and the professional identity of future teachers. The study concludes that while generative AI holds pedagogical potential, its unregulated use raises significant ethical risks. The study recommends the development of context-sensitive institutional AI ethics policies, targeted professional development for lecturers, and ethical literacy frameworks to support responsible AI integration in teacher education.

Key terms: Academic integrity, AI ethics, Data privacy, generative artificial intelligence, Ghana, teacher education.

1.0 INTRODUCTION

Generative artificial intelligence (AI) refers to computational systems that produce human-like text, images, audio, and other content using large-scale training data (e.g., ChatGPT, DALL·E, and Midjourney). Unlike traditional educational technologies, generative AI tools actively create content rather than merely delivering predefined instructional materials. In teacher education, these technologies are increasingly used to support lesson planning, instructional material development, assessment feedback, and reflective practice (Akanzire et al., 2025).

While global scholarship has documented both opportunities and ethical risks associated with generative AI in education, including concerns about academic integrity, bias, misinformation, and responsible governance, much of this literature is situated in Western and technologically advanced contexts (Munaye et al., 2025; Alfiras et al., 2026). In Ghana, Colleges of Education are undergoing digital transformation, yet the ethical implications of emerging AI technologies in teacher preparation programs remain underexplored. This gap is significant, as teacher trainees' early encounters with AI may shape their professional values, pedagogical judgment, and ethical decision-making in future classrooms.

2.0 LITERATURE REVIEW

The emergence of generative artificial intelligence (GenAI) technologies, particularly large language models like ChatGPT, has fundamentally transformed the educational landscape over the past two years. While these technologies present unprecedented opportunities for enhancing teaching and learning experiences, they simultaneously introduce complex ethical challenges that demand urgent attention from educators, policymakers, and institutions.

This literature review synthesises current research on generative AI integration in teacher education, with a specific focus on ethical considerations from both lecturer and student perspectives, aiming to inform evidence-based policy development and professional practice. The rapid proliferation of GenAI in educational settings reflects a broader technological shift that has outpaced institutional readiness and theoretical understanding. Unlike previous educational technologies, GenAI possesses the capability to generate human-like content autonomously, creating scenarios where traditional boundaries between appropriate and inappropriate use become blurred (Ko et al., 2025).

Teacher education programs, which prepare future educators, bear a unique responsibility to address these technologies not only as instructional tools but also as critical subjects of ethical inquiry that will shape the digital competence of the next generation of teachers. Current research reveals a significant preparedness gap among both lecturers and students regarding responsible GenAI integration. While approximately 88 per cent of students use AI tools regularly (Kotamjani et al., 2024), only about 40-50 per cent of lecturers have developed coherent frameworks for integrating these tools into their pedagogical practices (Ceallaigh et al., 2025). This disconnect highlights the urgent need for comprehensive institutional responses that account for the distinct perspectives and concerns of multiple stakeholders.

Current Adoption and Use of Generative AI in Teacher Education

Generative AI adoption in teacher education presents a complex picture characterised by enthusiasm tempered with caution. Research examining preservice teachers' engagement with GenAI reveals that text-based tools such as ChatGPT are the most familiar, with primary applications including editing papers,

searching for information, and understanding course material (Ko et al., 2025). However, this usage remains primarily surface-level, suggesting that deeper, more strategic integration has yet to materialise in many educational contexts.

Comparative analysis of adoption patterns across different institutional contexts demonstrates significant variation. In higher education settings where GenAI integration has been more deliberate, students report using AI tools for research support (approximately 64-88% frequency), idea generation, exam preparation, and writing assistance (Kotamjani et al., 2024). In contrast, faculty members tend to employ these tools more cautiously, primarily for administrative tasks such as lesson preparation, assessment design, and curriculum development, rather than for real-time classroom instruction (Cheah et al., 2025).

The disciplinary context significantly influences adoption patterns. Language education shows the highest adoption rates, with 40-50 per cent of educators actively incorporating GenAI into teaching, while STEM disciplines demonstrate more varied approaches. Healthcare and nursing education present an interesting case where institutional barriers and content sensitivity concerns limit integration despite high student interest (Hashish et al., 2025).

Perceived Benefits and Opportunities

The literature consistently identifies numerous benefits associated with GenAI integration in teacher education. Enhanced learning experiences emerge as a primary advantage, with 85% of research participants reporting that GenAI tools improved concept comprehension and engagement (Fuller & Barnes, 2024). Time efficiency represents another significant advantage, with educators reporting 60-80 hours of time savings per semester when using GenAI for administrative and instructional design tasks (Kaczorowski et al., 2024).

Personalisation of learning experiences constitutes a third major benefit. GenAI systems can dynamically adjust content difficulty, provide real-time feedback, and tailor explanations to individual learner needs, thereby addressing the heterogeneity inherent in educational settings (Henriksen et al., 2025). For students struggling with specific concepts, personalised explanations and targeted practice opportunities generated by AI systems can accelerate learning and reduce frustration (Jahani et al., 2025). From the instructor's perspective, GenAI offers transformative potential for curriculum design and assessment development. Teachers report using these tools to generate diverse assessment items, develop case studies, and create instructional scenarios that mirror real-world complexity (Kaczorowski et al., 2024). This capability is particularly valuable in professional preparation programs where authentic scenario development is pedagogically essential.

Lecturer Perspectives on Generative AI: Readiness, Concerns, and Needs

Research examining lecturer perspectives reveals a predominantly cautious stance toward GenAI integration. While 65-75 per cent of faculty members recognise the potential benefits of these technologies (Malik et al., 2024), institutional readiness to implement them effectively remains considerably lower, with only 45-55 per cent of lecturers reporting adequate preparation (Carcary & Buckland, 2025). This contrast between perceived advantages and real readiness implies that awareness by itself cannot ensure effective change.

Interestingly, the lecturer's perception of GenAI usefulness varies significantly by discipline and career stage. Younger faculty members and those in technology-intensive fields demonstrate greater optimism about GenAI's potential (Dring-Horvth et al., 2025), while more experienced educators express concerns about maintaining pedagogical integrity and student autonomy. Senior faculty members, particularly those with established teaching practices, report higher perceived risks associated with introducing these technologies (Ceallaigh et al., 2025).

An important finding from cross-cultural research indicates that lecturers' attitudes toward GenAI are not uniformly distributed across regions. Faculty in North America and Western Europe tend to be more receptive to GenAI integration, while educators in developing regions express greater concerns about technological infrastructure, institutional support, and alignment with local educational contexts (Aldawsari & Almohish, 2024). Academic integrity represents the preeminent concern among faculty members across diverse institutional contexts. Approximately 75-88 per cent of lecturers express significant apprehension about plagiarism and academic dishonesty facilitated by GenAI (Alsharefeen & Sayari, 2025). This concern is not merely theoretical; faculty report difficulty distinguishing between student-authored and AI-generated work, even when using detection tools (Kofinas et al., 2025).

A critical distinction has emerged in how faculty perceive different forms of AI-assisted misconduct. Direct copying of AI-generated content is viewed as clearly unethical by nearly all educators, while more subtle forms of assistance, such as using GenAI for paraphrasing, ideation, or organisation- present ethical grey areas where consensus is lacking (Alsharefeen & Sayari, 2025). This ambiguity creates practical challenges for assessment and enforcement, leading some educators to express frustration with institutional policies that fail to provide adequate guidance (Carcary & Buckland, 2025). Beyond academic integrity, lecturers voice concerns about cognitive over-reliance and the potential degradation of critical thinking and independent research skills. Approximately 70-80 per cent of faculty worry that student dependence on AI tools will undermine the development of essential intellectual capabilities (Malik et al., 2024). This concern is particularly acute in disciplines emphasising analytical reasoning, such as engineering, mathematics, and philosophy, where educators view struggle and independent problem-solving as pedagogically essential (Grey, 2025).

Professional Development and Support Needs

Lecturers consistently report inadequate preparation for integrating GenAI into their teaching. Fewer than 30 per cent of faculty members have received formal training on responsible GenAI use in educational contexts (Ceallaigh et al., 2025), and institutional support remains limited. When asked about necessary professional development components, faculty identify AI literacy, ethical frameworks, pedagogical integration strategies, and assessment redesign as critical needs (Brando et al., 2024). The research indicates that effective professional development for faculty must go beyond technical training to encompass ethical reasoning, critical evaluation of AI outputs, and pedagogical innovation. Short-term workshops, while valuable for initial exposure, prove insufficient for fostering deep engagement with these complex issues (Kaban et al., 2025).

Longitudinal, collaborative professional development that engages faculty in communities of practice appears more promising for sustained integration (Kelley & Wenzel, 2025). A particularly important finding concerns the relationship between faculty anxiety about AI and willingness to engage with professional development. Lecturers experiencing substantial anxiety about AI often avoid engaging with training

opportunities, creating a cycle in which concerns persist. Structured interventions that address both the emotional and technical dimensions of AI adoption demonstrate greater success in supporting faculty engagement (Kaban et al., 2025).

Student Perspectives: Enthusiasm, Challenges, and Ethical Awareness

Students demonstrate significantly greater enthusiasm for GenAI than their instructors, with approximately 70-85 per cent reporting positive attitudes toward AI-assisted learning (Ibeh et al., 2025). Usage patterns reveal that students employ GenAI tools across diverse academic activities: research support, writing assistance, concept clarification, exam preparation, and creative ideation. ChatGPT emerges as the dominant tool, with approximately 80 per cent of students who use AI tools regularly relying on this platform (Kotamjani et al., 2024). Importantly, student adoption of GenAI tools is largely self-directed and operates independently of institutional policies or faculty guidance. In many cases, students have integrated AI tools into their academic workflows without formal instruction or institutional acknowledgement (Jahani et al., 2025). This organic adoption contrasts sharply with institutional approaches and creates challenges for coherent policy development.

Gender, age, and prior technology experience show limited impact on student attitudes toward GenAI, though disciplinary context significantly influences usage patterns. STEM students and those in technology-focused programs demonstrate higher and more sophisticated usage patterns compared to humanities students (Kotamjani et al., 2024). International and multilingual students report particularly positive experiences with GenAI, citing the tools' value in overcoming language barriers and accessing complex academic content (Le et al., 2025). Despite enthusiasm for GenAI, students express substantial concerns about multiple dimensions of these technologies. Accuracy and reliability emerge as primary concerns, with 52-62 per cent of students questioning whether AI-generated content consistently provides accurate, trustworthy information (Ibeh et al., 2025). These concerns are justified; research documents numerous instances where GenAI systems generate plausible-sounding but factually incorrect information, a phenomenon known as "hallucination" (Cooper, 2023).

Privacy represents a second major concern, with 52-57 per cent of students expressing worry about data collection, unauthorised storage, and potential misuse of personal information submitted to GenAI systems (Ibeh et al., 2025). These concerns have intensified as awareness of AI training data provenance and data governance practices has increased (Garca-Lopez & Trujillo-Lin, 2025). A particularly nuanced finding concerns student awareness of ethical implications combined with ambivalence about behavioural change. Many students simultaneously report understanding the ethical concerns about academic integrity and acknowledging their own use of GenAI for purposes that could constitute misconduct (Lund et al., 2025). This gap between ethical awareness and behaviour suggests that factors beyond knowledge, such as social norms, institutional enforcement, and perceived consequences, significantly influence student decision-making about AI tool use (Lund et al., 2025).

Students express concern that over-reliance on GenAI tools could undermine their intellectual development, a concern that mirrors but is distinctly framed differently from faculty perspectives. Where faculty worry about skill degradation as an institutional problem, students frame autonomy concerns as personal developmental challenges (Irshad et al., 2025). Approximately 60 per cent of students report concerns that AI assistance might reduce their opportunities to develop independent problem-solving capabilities (Ibeh et al., 2025).

Interestingly, research examining actual cognitive impacts reveals complex relationships. While some students experience reduced engagement with challenging material when AI assistance is available, others use AI tools as scaffolding that enables them to tackle more complex problems than they could address independently (Jahani et al., 2025). The outcome appears substantially dependent on how students conceptualise and integrate AI tool use into their learning strategies. Students engaging in reflective practice regarding AI use demonstrate a more sophisticated understanding of when and how to employ these tools appropriately. Those who view GenAI as a research partner to be critically evaluated rather than an authority figure to be trusted uncritically display stronger critical thinking and more strategic tool use (Irshad et al., 2025).

Ethical Considerations and Academic Integrity

The emergence of GenAI has created unprecedented challenges for academic integrity frameworks that were developed in the context of traditional plagiarism and internet-enabled copying. Unlike previous plagiarism, which involved identifiable sources, GenAI-generated text appears original and appropriately tailored to assignment prompts, making detection and verification extraordinarily difficult (Ison, 2025). According to Saqib and Zia (2024), detection tools demonstrate inconsistent effectiveness, with accuracy ranging from 25 per cent to 90 per cent, and this is influenced by both the type of content and the AI tool used.

A critical finding from institutional policy research reveals that 94 per cent of universities have developed guidelines for GenAI use, yet these guidelines frequently lack clarity about specific practices (An et al., 2025). Faculty and students report confusion about what constitutes acceptable use, with ambiguity particularly acute regarding AI-assisted paraphrasing, co-authoring, and content refinement (Alsharefeen & Sayari, 2025). This ambiguity has practical consequences; some students inadvertently violate institutional policies while others deliberately exploit grey areas to gain academic advantage (Gonsalves, 2024). The nature of academic integrity violations involving GenAI differs fundamentally from traditional plagiarism. Using GenAI for brainstorming, organisation, or language refinement while maintaining substantive authorship might be distinguished from having GenAI generate entire assignments (Alsharefeen & Sayari, 2025). Yet institutional policies frequently treat these scenarios identically, creating a false equivalence that fails to capture the nuanced ethical issues involved (Sharma, 2025).

Data Privacy, Algorithmic Bias, and Fairness

Beyond academic integrity, GenAI systems introduce distinct ethical concerns regarding data privacy and algorithmic bias. When students and faculty submit assignment content, course materials, or institutional information to commercial GenAI platforms, they may inadvertently create data governance violations (Cao et al., 2024). In many jurisdictions, such uploads conflict with data protection regulations, creating legal and institutional risks. Algorithmic bias represents a second critical ethical dimension. GenAI systems trained on internet-scale data inevitably reflect and can amplify historical biases present in training data (Garca-Lopez & Trujillo-Lin, 2025).

Research documents differentiate performance across demographic groups, with non-English speakers, individuals from underrepresented communities, and students with non-traditional educational backgrounds receiving lower-quality responses (Henriksen et al., 2025). These biases can exacerbate existing educational inequities if GenAI tools are integrated without careful attention to fairness and accessibility (Szabo et al., 2025). The intersection of algorithmic bias and educational equity creates

particular concerns in diverse educational contexts. Students from privileged backgrounds with strong English proficiency experience GenAI tools as substantially more beneficial than marginalised students, potentially widening educational disparities rather than narrowing them (Szabo et al., 2025). Research examining GenAI in Global South contexts highlights how infrastructural limitations, language considerations, and cultural appropriateness of content generate additional ethical challenges (Szabo et al., 2025).

Transparency, Disclosure, and Informed Consent

An emerging ethical concern centres on transparency regarding AI use. Many institutions and educators lack clear policies requiring disclosure of AI tool deployment in educational processes (Cao et al., 2024). Students report uncertainty about whether they are interacting with AI systems, whether their interactions generate training data, and how their submissions are used (An et al., 2025). The concept of informed consent becomes ethically complicated in educational settings. Students may lack genuine choice about submitting work to systems containing GenAI, particularly when institutional assessment designs necessitate digital submission. Institutional policies regarding GenAI use in teaching similarly often lack mechanisms for genuine informed consent from students (Cao et al., 2024). Transparency concerns extend to how GenAI is used in assessment and decision-making about students. When generative AI is employed to evaluate student work, identify struggling learners, or make placement decisions, ethical principles demand transparency about these applications (Evangelista, 2025). Yet many educators use GenAI tools without explicitly informing students of this use, potentially violating informed consent principles.

Professional Development, AI Literacy, and Institutional Readiness

Emerging literature converges on defining AI literacy as encompassing multiple interrelated dimensions extending far beyond technical tool proficiency. Comprehensive frameworks identify five to nine core competency areas, including foundational AI knowledge, pedagogical application, ethical reasoning, critical evaluation capabilities, and data literacy (Dilek et al., 2025). These frameworks recognise that sustainable AI integration requires not merely technical skill but a deep understanding of AI capabilities, limitations, and societal implications. Research examining teacher AI literacy across multiple countries reveals significant gaps between importance and current proficiency. While AI pedagogical knowledge is recognised as critical (95% importance rating), only 40 per cent of teachers currently possess adequate proficiency in this area (En et al., 2025). Similar gaps exist for AI ethics and data literacy, creating a substantial professional development challenge for teacher education institutions (Tikhonova & Sabirova, 2025). Interestingly, affective dimensions of AI literacy encompassing attitudes, confidence, and dispositions toward AI emerge as stronger predictors of classroom integration than factual AI knowledge (Yang & Xia, 2025). Teachers with positive, curious orientations toward GenAI but limited technical knowledge frequently develop more sophisticated integration approaches than those with substantial technical knowledge but anxiety about technology. This finding suggests that professional development should prioritise shifting mindsets alongside knowledge development (Yang & Xia, 2025).

Evidence regarding effective professional development for GenAI literacy reveals that short-term interventions, while valuable for initial awareness, prove insufficient for sustained behavioural change. A professional development program lasting only two days significantly reduced AI anxiety but failed to shift educators' critical engagement with these technologies (Kaban et al., 2025). More promising approaches involve longitudinal, collaborative professional development embedded in communities of practice (Brando et al., 2024). The most effective professional development models share several characteristics: (1)

hands-on engagement with GenAI tools in authentic educational contexts; (2) facilitation of peer learning and collaborative problem-solving; (3) explicit attention to ethical issues and critical technology assessment; (4) integration of AI literacy throughout teacher education programs rather than isolated workshops; and (5) ongoing support through mentoring relationships and professional learning communities (Brando et al., 2024). Particular evidence supports the value of action research approaches wherein educators design classroom interventions using GenAI, implement them, systematically evaluate outcomes, and refine their practice based on evidence (Kelley & Wenzel, 2025). This approach develops both AI literacy and evidence-based teaching practices simultaneously, creating synergistic professional development.

Institutional Readiness, Support Infrastructure, and Policy Development

Successful integration of generative AI largely depends on the support provided by institutions. Research examining policy development at leading universities reveals that institutions most effectively implementing GenAI employ multi-faceted approaches encompassing clear guidelines, faculty training, technical support, and transparent communication with students (An et al., 2025). Conversely, institutions treating GenAI as a security threat requiring prohibition or attempting to address it solely through detection technologies show limited success in guiding ethical use (Losekoot, 2025). Current institutional capacity remains inadequate for this challenge. Approximately 50-70 per cent of universities have developed GenAI policies, yet fewer than 30 per cent provide corresponding faculty training (An et al., 2025). Institutional readiness also varies substantially by context; well-resourced universities in developed nations with established technology infrastructure demonstrate substantially greater readiness than institutions in resource-constrained contexts (Aldawsari & Almohish, 2024).

Successful institutional approaches recognise that GenAI presents not merely a crisis to be managed but an opportunity to advance broader educational goals. Institutions integrating GenAI within comprehensive digital transformation initiatives show greater success than those treating it as an isolated compliance challenge. Critical infrastructure includes: (1) clear, accessible institutional policies; (2) comprehensive faculty and student development programs; (3) accessible technical support systems; (4) transparent communication of policies and expectations; and (5) mechanisms for ongoing policy refinement as understanding evolves (Nartey, 2024).

Furthermore, the lack of reflexivity, critical self-examination by institutions regarding their digital practices, has led to inconsistent interpretations of academic dishonesty and responsible AI use. This was evident in the divergence of views across colleges about whether AI-assisted work should be allowed or penalised. Ultimately, a lack of responsiveness may reinforce systemic weaknesses, including the digital divide and algorithmic bias, especially in resource-limited settings such as Ghana.

This theoretical framing also underscores the risk of substituting meaningful ethical engagement for technological quick fixes. As Baron (2024) argues, over-reliance on AI-detection software or plagiarism scores can obscure the deeper educational challenge: how to cultivate ethical reasoning, critical thinking, and digital citizenship among students and educators. The ethical challenges reported by participants in this study, including confusion over authorship, fairness in grading, and the legitimacy of AI use, demonstrate the inadequacy of relying on punitive measures in the absence of a broader ethical culture. Here, Floridi's emphasis on building "distributed moral responsibility" becomes crucial, advocating for shared accountability among designers, educators, institutions, and learners.

In sum, the Digital Ethics and RRI Framework provides the theoretical foundation for this study's critique of AI's unregulated integration into teacher education. It emphasises that ethical and pedagogical challenges are not peripheral, but central, to the responsible adoption of emerging technologies. As Ghana's teacher education sector grapples with the rapid infiltration of generative AI, this framework calls for deliberate, inclusive, and anticipatory governance structures, ones that foster not only innovation but also fairness, transparency, and academic integrity.

3.0 METHODOLOGY

Using a qualitative descriptive design, the study explored how fast-developing generative AI technologies are affecting education worldwide, emphasising the ethical challenges that arise. The target population comprised lecturers and students from three purposively selected teacher training colleges in the Ashanti Region. College A and College B are urban-based mixed-sex institutions with similar student populations, while College C is an urban-based female-only college with a comparable student population. These colleges were chosen to ensure contextual diversity and enhance the transferability of findings. The study purposively sampled 15 lecturers and 50 students, with the final sample size determined by data saturation, at which point no new information emerged.

Data Collection Instruments and Validation

Semi-structured interviews with lecturers and student focus group discussions were employed to collect data. These methods were chosen to elicit rich, detailed narratives and to accommodate both individual and group perspectives. The interview and focus group guides were developed through an iterative process. Initially, the guides were constructed based on an extensive literature review of ethical challenges in AI-driven educational contexts and relevant theoretical frameworks. The preliminary guides underwent expert review by three subject matter experts with expertise in educational technology, research methodology, and AI ethics. Their feedback was incorporated to refine the language, clarity, and alignment with the research objectives.

Pilot testing was subsequently conducted with 2 lecturers and 1 focus group comprising 5 students from a comparable teacher training college outside the study sites. This pilot testing served to assess the appropriateness of the questions, clarity of instructions, estimated duration, and participants' understanding of key concepts. The pilot participants provided feedback on question relevance, and suggested modifications were implemented. Based on pilot findings, three questions were rephrased for improved clarity, and the interview duration was adjusted from 45 to 60 minutes to allow adequate exploration of participants' perspectives.

The study utilised thematic analysis to examine the data, using NVivo software for transcription and coding, combining inductive and deductive methods. To ensure inter-coder reliability, two researchers independently coded a portion of the data and resolved discrepancies through discussion and consensus. Ethical considerations were strictly observed. Participants provided informed consent before participation, and measures were taken to ensure anonymity and confidentiality. Ethical clearance was secured from the lead researcher's institutional review board.

4.0 RESULTS AND DISCUSSION

Thematic Analysis

Thematic analysis of the data collected from 15 lecturers (via semi-structured interviews) and 50 students (through focus group discussions) across three diverse teacher training colleges in the Ashanti Region revealed three key themes. These themes reflect participants' varied experiences and perceptions of generative AI within the context of teacher education in Ghana. The analysis focuses on three research objectives: (1) Understanding and Application of Generative AI in Teacher Education, (2) Ethical Concerns, and (3) Implications on Pedagogical Practices and Professional Identity. The analysis integrated both inductive insights from participant narratives and deductive alignment with existing literature, enhancing the interpretive depth and contextual relevance of the findings.

Thematic analysis of data collected from 15 lecturers through semi-structured interviews and 50 students via focus group discussions across three teacher training colleges in the Ashanti Region revealed three interconnected themes. These themes encompass the understanding and application of generative AI in teacher education, the ethical ambiguities and concerns associated with its use, and the implications for pedagogical practices and professional identity.

In line with the reviewers' recommendations, participant voices are foregrounded, and differences across participant categories (lecturers versus students) and institutional contexts are highlighted. Interpretation and theoretical integration follow the empirical accounts, ensuring that findings remain grounded in lived experiences while addressing the study's central research gap concerning ethical governance of generative AI in Ghanaian teacher education.

Understanding and Application of Generative AI in Teacher Education

Divergent Awareness Across Participant Groups and Institutions

"I only heard about ChatGPT through my students. I haven't used it myself yet, but I know they use it to complete assignments faster." (*Lecturer 2)*

"We weren't taught about these tools in class, but I've explored ChatGPT by myself. It saves me time, especially when I'm stuck on a topic." (*Student, FGD 1)*

Across all three colleges, students demonstrated higher familiarity and confidence in using generative AI tools such as ChatGPT and Google Bard than lecturers. This pattern was consistent regardless of gender but varied slightly by institution: students from the more urban-based college reported earlier exposure and more frequent use, while those in semi-rural colleges described exploratory and intermittent engagement.

Lecturers, by contrast, commonly reported encountering generative AI through students rather than institutional training, indicating a reversal of traditional pedagogical authority. This bottom-up diffusion of AI knowledge highlights a structural gap in teacher education, where formal curricular and professional development mechanisms lag behind students' informal digital practices.

Only a small number of lecturers, predominantly from one institution, reported experimenting with AI tools independently. This uneven institutional exposure underscores disparities in organisational readiness and reinforces the absence of coordinated strategies for AI integration across colleges.

From a theoretical standpoint, these findings expose a failure of anticipatory governance, a core principle of the Responsible Research and Innovation (RRI) framework. Rather than proactively shaping how generative AI should be understood and applied in teacher education, institutions are responding reactively, allowing students to set informal norms of use. This directly addresses the study's research gap by demonstrating how ethical and pedagogical oversight is not merely weak but structurally absent in Ghanaian teacher education.

Ethical Ambiguities and Concerns

Uncertainty, Inconsistency, and the Absence of Ethical Guidance

"Sometimes I feel guilty when I use ChatGPT to get answers. Am I cheating or just being smart?" (*Student, FGD 2)*

"It's unclear how much AI use is allowed. Some teachers accept it, others don't, and we don't have any clear rules." (*Student, FGD 3)*

"I worry that if students use AI to write everything, it becomes hard to tell what they know or don't know." (*Lecturer 6)*

Ethical uncertainty emerged as a dominant concern across all participant groups and institutions. Students frequently expressed guilt, confusion, and anxiety about authorship and plagiarism, while lecturers reported difficulty distinguishing legitimate learning support from academic misconduct.

Importantly, these concerns were not gender-specific, but they differed by participant category. Students framed ethical dilemmas in moral and emotional terms ("Am I cheating?"), whereas lecturers focused on assessment integrity and evaluative authority. Institutional differences were minimal, suggesting that ethical ambiguity is systemic rather than localised.

The lack of clear institutional policies resulted in inconsistent classroom practices, with lecturers individually determining acceptable AI use. This inconsistency undermines fairness and reinforces ethical confusion among students. When interpreted through the lens of digital ethics, these findings reflect precisely the risks associated with retrofitted ethics, where moral responsibility is applied only after technologies are already embedded in practice. Rather than ethics being designed into institutional systems, both lecturers and students are left to navigate complex moral decisions independently. This theme directly addresses the study's research gap by demonstrating that ethical challenges are not hypothetical, but actively experienced in everyday teaching and learning, yet remain ungoverned at the institutional level.

Implications for Pedagogical Practices and Professional Identity

Pedagogical Adaptation Without Institutional Support

"Instead of just lecturing, I now ask students to critique AI-generated content. It's made my teaching more interactive." (*Lecturer 1)*

"With AI tools, I feel like students challenge me more. Sometimes they come with answers I didn't expect." (*Lecturer 4)*

"ChatGPT helps me prepare for class by giving explanations I can build on." (*Student, FGD 1)*

Lecturers reported both pedagogical innovation and professional tension in response to students' use of generative AI. Some adapted by introducing critique-based and inquiry-oriented activities, particularly in colleges where AI use was more visible. These adaptations, however, were individual and reactive, rather than institutionally guided.

Students viewed AI as an empowering academic support tool, particularly for concept clarification and lesson preparation. This positive perception contrasted with lecturers' concerns about authority, authenticity, and professional relevance. The resulting tension highlights a shifting pedagogical relationship in which students increasingly act as technology intermediaries.

From a professional identity perspective, some lecturers expressed discomfort at being challenged by AI-generated responses, signalling a sense of displacement rather than empowerment. This experience reflects the absence of reflexive and responsive institutional support, key components of responsible innovation.
The findings, therefore, extend the research gap by showing that AI is reshaping not only pedagogy but also lecturers' professional identities, yet without ethical or institutional scaffolding to support this transformation.

Cross-Cutting Discussion
Taken together, the findings reveal a systemic disconnect between grassroots AI adoption and institutional preparedness in Ghanaian teacher education. While students are rapidly integrating generative AI into their learning practices, institutions have not anticipated, guided, or ethically framed this shift.

This disconnect confirms the central research gap identified in the study: the absence of context-sensitive ethical governance frameworks for generative AI in teacher education. The lack of anticipatory planning, inclusive dialogue, and ethical literacy means that AI integration is occurring in ways that risk deepening inequality, weakening academic integrity, and destabilising professional identity.

In low-resource contexts, these risks are amplified by infrastructural limitations and policy vacuums. Without deliberate institutional action, generative AI risks becoming a disruptive force rather than a responsibly governed educational innovation. The findings, therefore, underscore the urgent need for Colleges of Education in Ghana to embed digital ethics and responsible innovation principles into curriculum design, professional development, and institutional policy.

5.0 CONCLUSION AND RECOMMENDATIONS

Conclusion: This study explored how generative AI is influencing teacher education in Ghana, highlighting three key themes: limited but growing awareness, ethical uncertainties, and changing pedagogical roles. While students are more familiar with tools like ChatGPT than lecturers, both groups lack formal guidance, leading to inconsistent and often uneasy use.

The findings show that AI adoption is happening informally, without institutional support, raising concerns about plagiarism, academic integrity, and shallow learning. Lecturers are beginning to shift from content delivery to facilitation, using AI to encourage critical thinking. However, the use of AI also raises questions

about AI colonialism, as many tools are designed with Western datasets and assumptions that may not align with Ghanaian classroom contexts, potentially marginalising local knowledge and teaching practices.

These changes call for urgent action. Institutions must invest in AI literacy, ethical policies, and curriculum reforms that prepare educators to use AI responsibly. Infrastructure and access must also be addressed to prevent widening digital divides. In sum, generative AI presents both a challenge and an opportunity. Its thoughtful integration, mindful of local contexts and cultural relevance, can enrich teaching and learning, but neglecting its impact, including the risks of AI colonialism, could erode academic standards and equity. A balanced, ethical, and inclusive approach is essential for AI to become a positive force in teacher education.

Recommendations: To support the responsible integration of AI in teacher education, several key strategies are recommended. First, capacity building is essential, with institutions and the Ministry of Education providing continuous professional development on ethical and pedagogical AI use, enabling educators to critically reflect on their practices and respond responsibly to emerging technologies. Second, clear institutional policies on AI use should be developed collaboratively with diverse stakeholders to anticipate ethical risks, such as plagiarism or bias, and to ensure shared responsibility and inclusion. Third, teacher education programs should embed digital ethics, AI literacy, and responsible technology use into the curriculum, promoting reflexive thinking and anticipatory awareness of AI's pedagogical and societal implications. Fourth, longitudinal and interdisciplinary research should be conducted to monitor AI's impact on teaching, learning, and institutional culture, allowing institutions to anticipate challenges and respond effectively. Finally, stakeholder collaboration is crucial, with partnerships between educational institutions, AI developers, and civil society co-creating culturally relevant, ethically sound AI tools that are responsive to local classroom realities.

6.0 REFERENCES

1. Akanzire, B. N., Nyaaba, M., & Nabang, M. (2025). Generative AI in teacher education: Teacher educators' perception and preparedness. *Journal of Digital Educational Technology, 5*(1), ep2508.
2. AlAli, R., & Wardat, Y. (2024). Opportunities and challenges of integrating generative artificial intelligence in education. *International Journal of Religion, 5*, 784–793. https://doi.org/10.61707/8y29gv34
3. Alfiras, M. I. I., Emran, A. Q., & Mohamed, A. M. (2026). Ethics and governance of generative AI in education: A systematic review on responsible adoption. *Education, 5*, Article 37.
4. Baron, P. (2024). Are AI detection and plagiarism similarity scores worthwhile in the age of ChatGPT and other generative AI? *Scholarship of Teaching and Learning in the South, 8*, 151–179. https://doi.org/10.36615/sotls.v8i2.411
5. Bird, C., Ungless, E., & Kasirzadeh, A. (2023). Typology of risks of generative text-to-image models. In *Proceedings of the 2023 AAAI/ACM Conference on AI, Ethics, and Society* (pp. 396–410). ACM. https://doi.org/10.1145/3600211.3604681
6. Black, J., & Chaput, T. (2024). A discussion of artificial intelligence in visual art education. *Journal of Computer and Communications, 12*, 71–85. https://doi.org/10.4236/jcc.2024.125005
7. Chen, X., Liao, Y., & Yu, W. (2024). Generative AI in higher art education. In *Proceedings of the 2024 6th International Conference on Computer Science and Technologies in Education (CSTE)* (pp. 135–140). IEEE. https://doi.org/10.1109/CSTE62025.2024.00032

8. Chia, H. (2023). Turnitin's AI writing detection tool: Capabilities and limitations. *EdTech Watch*.
9. Fleischmann, K. (2024). Generative artificial intelligence in graphic design education: A student perspective. *Canadian Journal of Learning and Technology, 50*, 1–17. https://doi.org/10.21432/cjlt28618
10. Floridi, L. (2019). Translating principles into practices of digital ethics: Five risks of being unethical. *Philosophy & Technology, 32*(2), 185–193. https://doi.org/10.1007/s13347-019-00354-x
11. Graham, M. (2022). Artificial intelligence and the problem of trust in education. *Journal of Educational Technology and Ethics, 3*(1), 35–47.
12. Heaton, R., Low, J. H., & Chen, V. (2024). AI art education—Artificial or intelligent? Transformative pedagogic reflections from three art educators in Singapore. *Pedagogies: An International Journal, 19*, 647–659. https://doi.org/10.1080/1554480X.2024.2395260
13. Hutson, J., & Cotroneo, P. (2023). Praxis and augmented creativity: A case study in the use of generative artificial intelligence (AI) art in the digital art classroom. *The International Journal of Technologies in Learning, 31*, 113–132. https://doi.org/10.18848/2327-0144/CGP/v31i01/113-132
14. Hutson, J., & Lang, M. (2023). Content creation or interpolation: AI generative digital art in the classroom. *Metaverse, 4*, Article 13. https://doi.org/10.54517/m.v4i1.2158
15. Jiang, H. H., Brown, L., Cheng, J., Khan, M., Gupta, A., Workman, D., et al. (2023). AI art and its impact on artists. In *Proceedings of the 2023 AAAI/ACM Conference on AI, Ethics, and Society* (pp. 363–374). ACM. https://doi.org/10.1145/3600211.3604681
16. King, A., & ChatGPT. (2023). Dialoguing with AI: Pedagogical promises and pitfalls of ChatGPT. *Teaching in Higher Education, 28*(1), 101–120.
17. Kong, L., Guo, X., & Liu, Y. (2024). The impact of digital media, virtual reality, and computer-generated art on traditional art forms. *SHS Web of Conferences, 183*, Article 01004. https://doi.org/10.1051/shsconf/202418301004
18. Li, M. (2024). The impact of ChatGPT on teaching and learning in higher education: Challenges, opportunities, and future scope. In *Encyclopedia of Information Science and Technology* (6th ed., pp. 1–20). IGI Global. https://doi.org/10.4018/978-1-6684-7366-5.ch079
19. MacNeil, D., Zhao, Y., & Greene, C. (2022). Natural language generation in higher education. *Language and Learning Technologies Review, 4*(2), 29–41.
20. Mollick, E., & Mollick, L. (2023). Assigning AI: Seven approaches for students with prompts. *SSRN*. https://doi.org/10.2139/ssrn.4391047
21. Murray, M. D. (2023). Generative AI art: Copyright infringement and fair use. *SMU Science and Technology Law Review, 26*, 259–278. https://doi.org/10.25172/smustlr.26.2.4
22. Munaye, Y. Y., Admass, W., Belayneh, Y., Molla, A., & Asmare, M. (2025). ChatGPT in education: A systematic review on opportunities, challenges, and future directions. *Algorithms, 18*(6), 352.
23. Park, Y. S. (2023). Creative and critical entanglements with AI in art education. *Studies in Art Education, 64*, 406–425. https://doi.org/10.1080/00393541.2023.2255084
24. Pavlik, J. V., & Pavlik, O. M. (2024). Art education and generative AI: An exploratory study in constructivist learning and visualization automation for the classroom. *Creative Education, 15*, 601–616. https://doi.org/10.4236/ce.2024.154037
25. Pente, P., Adams, C., & Yuen, C. (2023). Artificial intelligence, ethics, and art education in a posthuman world. In A. D. Knochel & O. Sahara (Eds.), *Global media arts education: Mapping*

global perspectives of media arts in education (pp. 197–211). Springer. https://doi.org/10.1007/978-3-031-05476-1_12

26. Perkins, M. (2023). Academic integrity considerations of AI large language models in the post-pandemic era: ChatGPT and beyond. *Journal of University Teaching and Learning Practice, 20*, Article 7. https://doi.org/10.53761/1.20.02.07

27. Prasad, S., & Śliwa, M. (2022). Humanizing education in the age of AI. *Pedagogy and Praxis Review, 5*(1), 42–55.

28. Rudolph, J., Tan, S., & Tan, C. (2023). AI hallucinations and the limits of language models in academic work. *Learning, Media and Technology, 48*(3), 265–280.

29. Rusmiyanto, R., Huriati, N., Fitriani, N., Tyas, N. K., Rofi'i, A., & Sari, M. N. (2023). The role of artificial intelligence (AI) in developing English language learners' communication skills. *Journal on Education, 6*, 750–757. https://doi.org/10.31004/joe.v6i1.2990

30. Sáez-Velasco, S., Alaguero-Rodríguez, M., Delgado-Benito, V., & Rodríguez-Cano, S. (2024). Analysing the impact of generative AI in arts education: A cross-disciplinary perspective of educators and students in higher education. *Informatics, 11*, Article 37. https://doi.org/10.3390/informatics11020037

31. Slimi, Z., & Villarejo Carballido, B. (2023). Navigating the ethical challenges of artificial intelligence in higher education: An analysis of seven global AI ethics policies. *TEM Journal, 12*, 590–602. https://doi.org/10.18421/TEM122-02

32. Stilgoe, J., Owen, R., & Macnaghten, P. (2013). Developing a framework for responsible innovation. *Research Policy, 42*(9), 1568–1580. https://doi.org/10.1016/j.respol.2013.05.008

33. Thorp, H. (2023). ChatGPT and the future of scientific writing. *Science, 379*(6630), 313. https://doi.org/10.1126/science.adg7879

34. van Dis, E. A. M., Bollen, J., Zuidema, W., van Rooij, R., & Bockting, C. L. H. (2023). ChatGPT: Five priorities for research. *Nature, 614*, 224–226. https://doi.org/10.1038/d41586-023-00288-7

35. Vyas, R. (2022). Ethical implications of generative AI in art and the media. *International Journal for Multidisciplinary Research, 4*, 1–11. https://www.researchgate.net/publication/376717725

36. Zhou, E., & Lee, D. (2024). Generative artificial intelligence, human creativity, and art. *PNAS Nexus, 3*(3), pgae052. https://doi.org/10.1093/pnasnexus/pgae052