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AI as a Pedagogical Actor in Multilingual Contexts: A *Critical Review* of Benefits, Epistemic Threats, and Governance Gaps in Tanzanian Education

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Abstract: *The rapid integration of Artificial Intelligence (AI) into global education systems presents a paradox of promise and peril, particularly for multilingual societies in the Global South. While AI offers scalable solutions for personalised learning, its deep-seated implications for pedagogical authority, cognitive development, and linguistic diversity remain critically underexplored. This paper addresses this gap by conducting a critical, theory-informed literature review that synthesises scholarly evidence on AI's pedagogical benefits, structural challenges, and transformative threats, with a specific focus on language education in Tanzania. Drawing on a semi-systematic search of global and Tanzanian scholarly and policy literature published between 2019 and 2025, 50 key sources were thematically analysed through an integrative framework combining critical pedagogy, sociocultural theory, and technology mediation perspectives. The results confirm that AI can enhance personalised feedback and access to learning resources in resource-constrained settings. However, the review critically extends existing discourse by conceptualising AI not merely as a tool, but as a socio-technical and epistemic actor. The analysis reveals significant pedagogical threats, including: (a) cognitive deskilling from learner over-reliance on generative AI; (b) a shift in epistemic authority from educators to opaque algorithmic systems, potentially deprofessionalising teachers; and (c) linguistic homogenisation, where AI models trained on dominant global languages marginalise Kiswahili and indigenous languages, reinforcing epistemic inequalities. The discussion interprets these findings as manifestations of a nascent "algorithmic pedagogy" that is poorly aligned with local sociocultural realities. The paper's primary contribution is a context-sensitive framework for understanding AI's multi-dimensional impact, which foregrounds issues of epistemic justice and linguistic inclusion often absent from mainstream adoption debates. It concludes that realising AI's potential in contexts like Tanzania requires a paradigm shift from technology-centric adoption to pedagogically-driven integration. Key recommendations include the urgent development of national AI governance frameworks that mandate linguistic inclusivity, investment in localised, low-resource language AI models, and the redesign of curricula to cultivate critical AI literacy among both students and educators, ensuring technology serves, rather than subverts, sustainable and equitable educational development.*

Keywords: *Artificial Intelligence in Education (AIEd), Critical pedagogy, Multilingual education, Epistemic justice, Tanzania*

1. Background Information

Artificial Intelligence (AI) has rapidly emerged as a transformative force in global education, fundamentally reshaping teaching practices, learning processes, and educational governance. AI-driven systems, including intelligent tutoring systems, automated assessment tools, and generative language models, are increasingly presented as solutions to enhance learner engagement, personalise instruction, and support scalable educational delivery (Holmes *et al.,* 2019; Zawacki-Richter *et al.,* 2019; UNESCO, 2023). In the specific domain of language education, AI applications have demonstrated potential to scaffold vocabulary development, provide dynamic writing feedback, and enable autonomous learning through adaptive digital environments (Kohnke *et al.,* 2023). This global trajectory suggests AI is not merely an incremental innovation but a disruptive force challenging established instructional models, assessment paradigms, and the very nature of learner engagement (UNESCO, 2023). Machine learning, natural language processing, and predictive analytics are now embedded in adaptive platforms, positioning AI as a co-learner, tutor, or cognitive partner in knowledge construction (Yan, 2025; Zawacki-Richter *et al.,* 2019). Bibliometric analyses indicate a significant shift in research focus since 2020 towards the ethical implications of AI, the promotion of AI literacy, and the need for robust pedagogical governance, reflecting growing scholarly

concern about its systemic educational impact (Zawacki-Richter *et al.,* 2019).

In Tanzania and across the African continent, the adoption of AI in higher education is expanding rapidly, mirroring global trends while being shaped by distinct local realities. University students are increasingly using generative AI tools for academic writing, translation, and idea generation, reporting improvements in writing clarity, comprehension, and learner autonomy when these tools are pedagogically guided (Mbwambo, 2024; Matto, 2024, 2025; Mwakapina, 2024). Students value AI for its capacity to provide instant feedback and simplify complex explanations, thereby enhancing academic productivity in large-class, resource-constrained environments (Kondoro, 2025). However, this integration is fraught with significant structural and institutional constraints. Research persistently identifies challenges related to limited digital infrastructure, unequal access to devices, unreliable internet connectivity, and low levels of AI literacy among both teachers and students (AI4A, 2022; Maganga & Srivastava, 2025). While policy frameworks such as Tanzania's National Digital Education Strategy and emerging AI-in-Education guidelines signal governmental intent, their implementation remains uneven across institutions, further complicated by new data privacy obligations introduced by legislation like the Personal Data Protection Act (United Republic of Tanzania, 2025).

Beyond these infrastructural and policy gaps, a more profound set of pedagogical, ethical, and epistemological concerns has emerged. Scholars globally have documented risks associated with academic dishonesty, plagiarism, and a decline in critical thinking skills among learners who excessively rely on AI-generated content, effectively outsourcing cognitive effort to algorithms (Bretag *et al.,* 2019; Kasneci *et al.,* 2023). Tanzanian instructors echo these concerns, reporting student overreliance on AI tools that raises red flags about cognitive disengagement and the potential erosion of foundational academic literacy skills (Matto, 2024). This has led to debates about the emergence of "*shadow pedagogies,*" where students use AI without formal guidance or ethical frameworks, as adoption has outpaced institutional preparedness (Mazaheriyan & Nourbakhsh, 2025). Critical scholars argue that these risks are not merely incidental but represent transformative threats, including cognitive deskilling and a fundamental redistribution of epistemic authority from teachers to algorithmic systems (Selwyn, 2016).

In linguistically and culturally diverse contexts such as Tanzania, these threats are amplified. AI systems are not culturally neutral; they are trained predominantly on datasets from the Global North, which encode specific cultural values and epistemic biases. Consequently, they disproportionately privilege dominant global languages like English, while offering limited support for *Kiswahili* and indigenous African languages (Jaffer & Sayer, 2025; Ondiba, 2024). This linguistic imbalance raises critical concerns about data colonialism, linguistic homogenisation, and the erosion of cultural identity, as AI systems function as de facto language policy actors that shape linguistic practices and knowledge hierarchies in educational settings (Adebara, 2025; Atenas *et al.,* 2024; UNESCO, 2024). Critical sociolinguistic scholarship thus positions AI not as a neutral tool but as an active force that can either reinforce or challenge existing epistemic and linguistic inequalities (Bouakaz and Khalid, 2025; Makalela, 2015; Bamgbose, 2011).

Cross-regional syntheses confirm that while AI integration is accelerating globally, strong empirical evidence on its long-term impact on learning outcomes remains limited, particularly in African multilingual contexts (Garzón et al., 2025). Scholars increasingly emphasise the urgent need for localised AI models, culturally responsive pedagogies, and context-sensitive governance frameworks that address the intertwined issues of language, identity, and equity (Garzón *et al.,* 2025; UNESCO, 2024). Despite a growing body of literature, few integrative reviews have critically examined AI's pedagogical threats alongside its benefits and challenges within a framework that centres on epistemic justice and linguistic diversity. This study addresses this critical gap by synthesising scholarly arguments on AI's pedagogical benefits, challenges, and transformative threats, with a particular focus on language education in Tanzania. Therefore, by integrating perspectives from critical pedagogy, sociocultural theory, and technology mediation, this review conceptualises AI as a socio-technical and epistemic actor, providing a theoretically informed and contextually grounded analysis essential for developing equitable and sustainable AI integration policies in Tanzania and comparable multilingual contexts in the Global South.

2.0 Theoretical Framework

This critical review is anchored in an integrative theoretical framework that combines insights from critical pedagogy, sociocultural theory of learning, and technology mediation and acceptance theories. Together, these perspectives provide a multi-dimensional analytical lens for examining Artificial Intelligence (AI) not merely as a technological innovation, but as a socio-cultural, pedagogical, and epistemological force reshaping contemporary education. Table 1 below synthesises these theoretical perspectives, their core tenets, their application to AI in education, and the key scholarly sources informing this review.

Table 1: Integrative Theoretical Framework for Analysing AI in Education

Theoretical Perspective	Core Tenets	Application to AI in Education	Key Sources
Critical Pedagogy	Education is a political act; technologies are not neutral but embed power relations, cultural hierarchies, and ideological interests. Knowledge is contested, and pedagogy should foster critical consciousness.	AI systems are examined as socio-political artefacts that can reproduce or challenge epistemic dominance, linguistic hierarchies, and economic interests. This lens interrogates whose knowledge is legitimised and whose languages are privileged by AI algorithms.	Freire (1970); Giroux (2011); Atenas *et al.* (2024); Selwyn (2016)
Sociocultural Theory of Learning	Learning is socially constructed and mediated through cultural tools, language, and interaction with others. Cognitive development occurs within a learner's Zone of Proximal Development (ZPD) with appropriate scaffolding.	AI is conceptualised as a digital cultural tool and mediational artefact. It can scaffold learning by providing adaptive feedback and personalised pathways within a learner's ZPD. However, it also carries the risk of diminishing socially-mediated learning and productive cognitive struggle if it replaces, rather than supports, human interaction.	Vygotsky (1978); Giannakos *et al.* (2024); Yan (2025)
Technology Mediation & Acceptance	Technology Acceptance Model (TAM) posits that perceived usefulness and ease of use drive adoption. Critical perspectives argue that adoption driven by efficiency often overlooks ethical and pedagogical consequences, positioning technology as an active mediator of social practices.	TAM explains the rapid uptake of AI tools by students and educators for productivity and convenience. Critical mediation perspectives, however, examine how AI, once adopted, actively reshapes pedagogical practices, assessment, and the teacher-learner relationship, often becoming a de facto curriculum actor.	Davis (1989); Selwyn (2016); Williamson (2021)

2.1 Critical Pedagogy: *Unmasking Power and Ideology in AI*

From the standpoint of critical pedagogy, educational technologies are conceptualised as socio-political and ideological artefacts embedded in power relations, rather than neutral instructional tools. Foundational scholars in this tradition argue that technologies reflect and reproduce dominant epistemologies, cultural hierarchies, and economic interests, thereby shaping what knowledge is legitimised in educational institutions (Freire, 1970; Giroux, 2011). Recent scholarship extends this critique directly to AI, emphasising that algorithmic systems encode cultural values, epistemic biases, and political-economic interests that influence curricular priorities, knowledge representation, and linguistic hierarchies (Atenas *et al.,* 2024). In African multilingual contexts, this perspective is particularly salient. AI systems trained predominantly on Global North datasets risk marginalising indigenous knowledge systems and local languages, thereby reinforcing epistemic and linguistic inequalities that mirror historical patterns of colonialism (Adebara, 2025; Jaffer & Sayer, 2025). This review, therefore, adopts a critical pedagogical stance to interrogate how AI may function as a language policy actor, shaping linguistic practices, knowledge hierarchies, and the distribution of epistemic authority in language education (Bamgbose, 2011; Makalela, 2015).

2.2 Sociocultural Theory: *AI as a Mediational Tool for Learning*

Sociocultural theory of learning further frames AI as a mediational tool embedded in social interaction, language, and cultural practices. Learning, from this perspective, is understood as socially constructed and mediated through cultural artefacts; AI is thus conceptualised as a digital cultural tool that can scaffold cognitive development (Vygotsky, 1978). AI-supported adaptive feedback, personalised learning pathways, and collaborative platforms can, in principle, extend learners' zones of proximal development (ZPD) by providing timely scaffolding and opportunities for interaction. Research has shown that when pedagogically guided, AI tools can enhance writing quality, vocabulary acquisition, and learner autonomy (Kohnke *et al.,* 2023; Mwakapina, 2024; Yan, 2025). However, recent research cautions that excessive automation and uncritical reliance on AI may reduce productive cognitive struggle and diminish the socially mediated processes that are fundamental to deep learning (Giannakos *et al.,* 2024). If learners outsource intellectual work to algorithmic systems, AI may lead to epistemic passivity and surface-level engagement with knowledge rather than fostering genuine understanding (Vieriu and Petrea, 2025). From this perspective, AI's pedagogical impact is contingent on how it is embedded within social learning environments and guided by skilled educators.

2.3 Technology Mediation and Acceptance: *From Adoption to Consequence*

Technology mediation and acceptance theories provide complementary insights into why AI tools are being rapidly adopted in educational settings and the consequences of that adoption. The Technology Acceptance Model (TAM) posits that perceived usefulness and perceived ease of use are primary drivers of technology adoption (Davis, 1989).

Empirical studies from Tanzanian universities confirm this, showing that students and educators adopt AI tools for their efficiency, academic productivity, and convenience (Mbwambo, 2024; Matto, 2024). However, critical educational technology scholars argue that an acceptance-driven focus on utility and efficiency often overlooks the deeper ethical, pedagogical, and political implications of technology integration (Selwyn, 2016). Contemporary debates suggest that when AI is adopted primarily for its usefulness, it risks becoming a de facto curriculum actor that shapes learning content, pedagogy, and assessment without sufficient educational governance or critical oversight (Bouakakaz, 2025). Furthermore, technology mediation perspectives, as articulated by scholars like Williamson (2021), emphasise that AI does not simply support existing practices but actively mediates and reshapes them, leading to the datafication of education and a redistribution of power from teachers to technological systems.

2.4 Integrative Synthesis: *AI as a Socio-Technical and Epistemic Actor*

Integrating these theoretical perspectives, this review conceptualises AI as a socio-technical and epistemic actor that mediates learning, redistributes pedagogical power, and reshapes language education practices. Critical pedagogy foregrounds issues of power, inequality, and linguistic dominance; sociocultural theory explains AI's mediational role in cognitive development; and technology acceptance theories reveal the drivers of its rapid adoption while critical mediation perspectives illuminate its systemic consequences. This integrated framework allows the review to move beyond binary narratives of AI as either beneficial or harmful. Instead, it positions AI as a contested pedagogical actor whose impact is contingent upon the sociocultural, institutional, and ideological conditions in which it is embedded. This theoretical integration is essential for critically examining AI's pedagogical benefits, challenges, and threats, particularly in multilingual educational contexts such as Tanzania, where issues of language, identity, equity, and epistemic authority are deeply intertwined.

3.0 Methodology

3.1 Research Design

This study adopts a qualitative critical literature review design grounded in documentary analysis. Critical literature reviews aim to interpret, synthesise, and theorise existing scholarship rather than exhaustively catalogue all studies, enabling deeper conceptual and contextual analysis of complex educational phenomena such as AI in education (Grant & Booth, 2009). This approach is particularly appropriate for examining AI's pedagogical benefits, challenges, and threats in multilingual educational contexts, as it allows for the integration of theoretical perspectives with empirical evidence to generate new insights. Unlike systematic reviews that prioritise exhaustive coverage and statistical aggregation, this critical review emphasises theoretical integration, contextual interpretation, and analytical synthesis of scholarly debates across global, African, and Tanzanian contexts (Torraco, 2016).

3.2 Data Sources and Search Strategy

Scholarly documents were retrieved from multiple academic and policy-oriented databases and repositories to ensure comprehensive coverage of both peer-reviewed research and grey literature. These sources included Google Scholar, JSTOR, Taylor & Francis Online, Scopus-indexed journals, institutional repositories, UNESCO, governmental policy databases, and Tanzanian university digital libraries.

Search strings were developed iteratively and included combinations of keywords such as: *"artificial intelligence in education," "generative AI in language learning," "ChatGPT in higher education," "AI in African education," "AI Tanzania education policy,"* and "*AI pedagogical risks."* Boolean operators (AND, OR) and truncation were used to refine the search (e.g., *AI AND education*, *generative AI AND language*). Reference chaining (snowballing) was also employed to identify additional relevant studies from the bibliographies of key publications, a technique recommended for ensuring saturation in qualitative reviews (Wohlin, 2014).

3.3 Inclusion and Exclusion Criteria

To ensure relevance, scholarly rigour, and appropriateness, documents were selected using the criteria outlined below. The period of 2019 to 2025 was chosen to capture the most recent developments in AI, particularly the emergence and rapid integration of generative AI tools in education.

Inclusion Criteria

i. *Publication Period:* Documents published between 2019 and 2025.
ii. *Document Type:* Peer-reviewed journal articles, scholarly books, conference proceedings, institutional reports, and policy documents with recognised academic or institutional credibility.
iii. *Topical Focus:* Studies focusing on AI in teaching and learning, with particular relevance to language education, pedagogy, assessment, or educational governance.
iv. *Geographical Scope:* Sources from global, African, and Tanzanian contexts to allow for comparative analysis and contextual grounding.

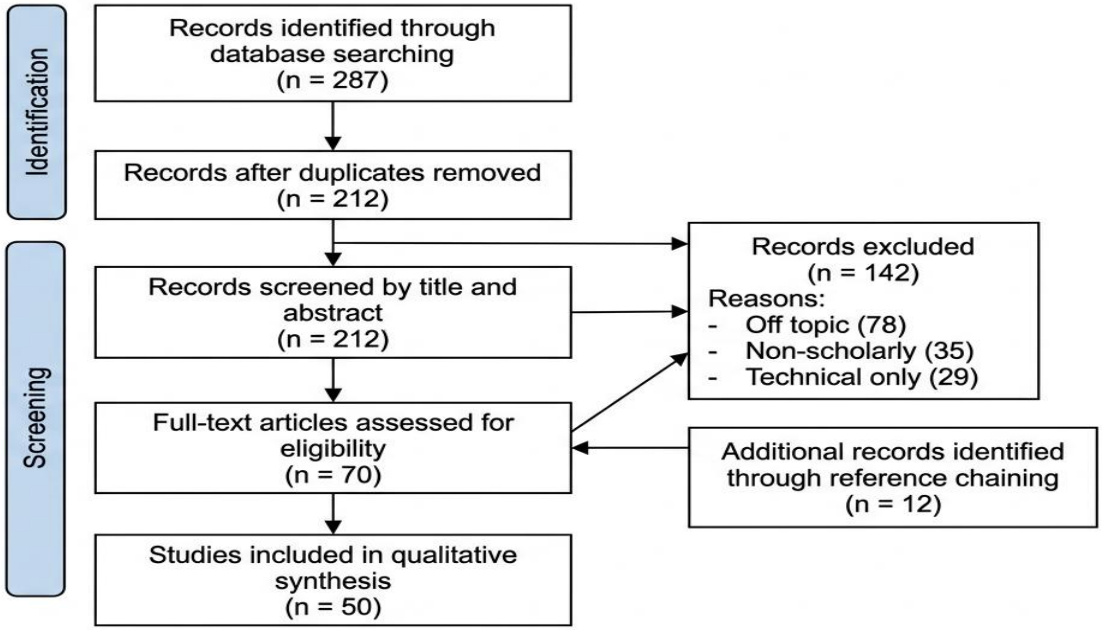
Exclusion Criteria

i. Non-scholarly opinion pieces, blog posts, and non-reviewed media articles.
ii. Purely technical AI or computer science studies without explicit educational relevance or pedagogical discussion.
iii. Publications lacking methodological transparency or clear institutional credibility.
iv. Duplicated or outdated sources that had been superseded by more recent versions or more comprehensive studies.

3.4 Document Selection Process

The document selection process followed a systematic approach, adapted from the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure transparency and replicability (Page *et al.,* 2021). The process is illustrated in Figure 1.

Figure 1: PRISMA Flow Diagram of Document Selection Process



Note: Adapted from the PRISMA 2020 flow diagram template (Page *et al.,* 2021).

As shown in Figure 1, the initial database search yielded 287 records. After removing duplicates (n=75), 212 records were screened by title and abstract. Of these, 142 were excluded for being off-topic, non-scholarly, or purely technical. The full texts of the remaining 70 articles were assessed for eligibility. An additional 12 records were identified through reference chaining from key publications. Following full-text assessment, 32 articles were excluded, resulting in a final analytical corpus of 50 key documents.

3.5 Analytical Procedure

The selected documents were subjected to thematic matrix analysis, a technique suitable for synthesising qualitative evidence across a heterogeneous body of literature (Miles, Huberman, & Saldaña, 2020). Each source was coded for:

(a) pedagogical benefits of AI,

(b) pedagogical and structural challenges in AI integration, and

(c) pedagogical threats and transformative risks.

Coding was iterative and reflexive, allowing themes to emerge inductively while also being guided by the study's theoretical framework (critical pedagogy, sociocultural theory, and technology mediation theories). To enhance transparency and enable structured evidence mapping, the final 50 sources were systematically classified according to key descriptors, as presented in Table 2.

Table 2: Classification of the Final Analytical Corpus (N=50)

Descriptor	Category	Number of Sources (n)	Percentage (%)
Geographical Focus	Global / International	22	44%
	African (excluding Tanzania)	8	16%
	Tanzanian	20	40%
Education Level	Higher Education	30	60%
	General / K-12 / All Levels	20	40%
Methodological Approach	Empirical (Qual/Quant/Mixed)	22	44%
	Conceptual / Theoretical	15	30%
	Policy / Review	13	26%
Primary AI Focus	Generative AI / LLMs	18	36%
	General AI in Education	20	40%
	AI in Language Education	12	24%
Scholarly Contribution	Reports Benefits	18	36%
	Identifies Challenges	17	34%
	Highlights Threats	15	30%

3.6 Quality Appraisal and Reflexivity

To enhance analytical rigour, the included sources were evaluated for methodological transparency, empirical grounding, and theoretical contribution. Peer-reviewed studies and policy reports from reputable international organisations (e.g., UNESCO, OECD, World Bank) and Tanzanian governmental bodies were prioritised. Reflexive memoing was used throughout the analysis to document analytical decisions, track the emergence of themes, and mitigate interpretive bias, acknowledging the authors' positioning as language education scholars working within the Tanzanian higher education context (Berger, 2015).

3.7 Ethical Considerations

This study relied exclusively on publicly available documents and did not involve human participants; therefore, formal ethical clearance was not required. However, ethical scholarly practice was maintained throughout, including accurate citation, responsible representation of authors' arguments, and critical but fair interpretation of policy and empirical evidence.

4.0 RESULTS AND DISCUSSION

This section presents a thematic synthesis of the findings from the 50 reviewed sources, integrated with theoretical interpretation. The results are organised around three analytical domains derived from the thematic matrix analysis: (1) pedagogical benefits of AI, (2) pedagogical and structural challenges, and (3) pedagogical threats and transformative risks. Each domain is discussed in relation to the integrative theoretical framework (critical pedagogy, sociocultural theory, and technology mediation), with particular attention to implications for multilingual Tanzanian contexts. Figure 2 provides a visual synthesis of the thematic distribution across the corpus, illustrating the balance of scholarly discourse.

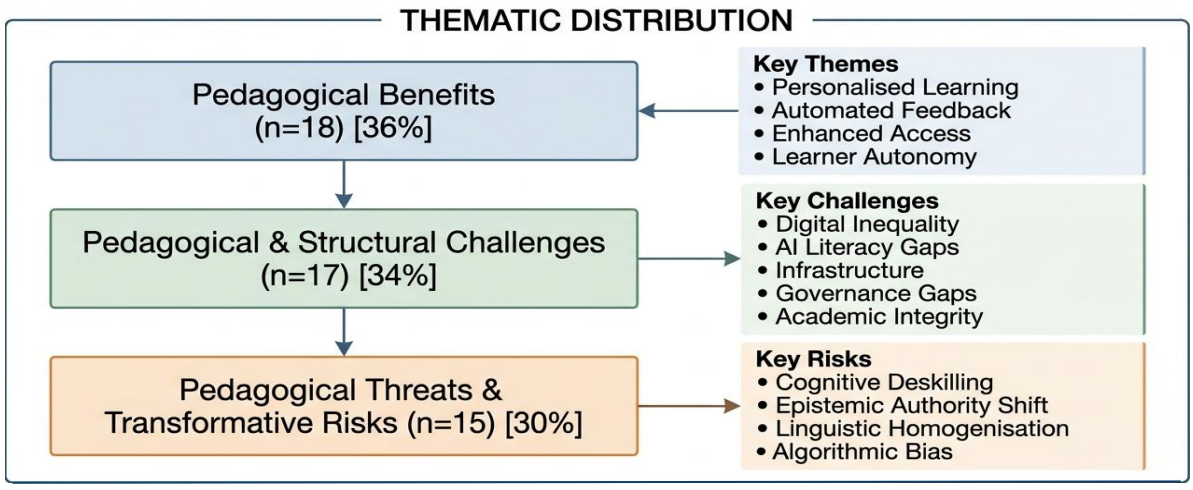
4.1 Pedagogical Benefits of AI in Education

The reviewed studies consistently highlight AI's potential as a mediational tool that enhances instructional delivery, learner engagement, and personalised learning. Across global and Tanzanian contexts, AI-supported tools such as intelligent tutoring systems, automated feedback mechanisms, and generative language models are reported to improve academic productivity and learner autonomy. Table 3 synthesises the key benefits reported in the literature, organised by thematic sub-category.

Empirical studies in language education demonstrate improvements in vocabulary acquisition, writing clarity, and comprehension when AI tools are pedagogically guided (Kohnke *et al.,* 2023; Mwakapina, 2024). In Tanzanian universities, students report that AI-supported tools help clarify complex concepts and improve the structural quality of their academic writing (Mwakapina, 2024; Mbwambo, 2024). Furthermore, AI is reported to mitigate challenges associated with large class sizes and limited teaching resources, a particularly salient benefit in African higher education contexts where student-educator ratios are often high (Matto, 2024; Kondoro, 2025).

From a sociocultural perspective, these findings suggest that AI functions as a digital cultural artefact that can effectively extend learners' zones of proximal development (ZPD) by providing timely scaffolding and adaptive support (Vygotsky, 1978; Yan, 2025). When embedded within structured pedagogical frameworks, AI can facilitate cognitive development by offering personalised challenges and feedback that would be impossible for a single educator to provide at scale (Giannakos *et al.,* 2024). The concept of AI as a "*co-learner*" or "*cognitive partner*" is particularly relevant here, as emerging human-AI collaborative learning

Figure 2: Thematic Distribution of Scholarly Discourse on AI in Education (N=50)



Note: Figure 2 illustrates the proportional distribution of scholarly focus across the three analytical themes in the reviewed corpus (N=50). The percentages indicate the proportion of sources primarily contributing to each thematic domain.

frameworks propose that AI can support learners through dialogic interaction and collaborative problem-solving (Yan, 2025).

Table 3: Synthesis of Reported Pedagogical Benefits of AI in Education

Benefit Category	Specific Pedagogical Benefits	Supporting Sources
Personalised Learning	Adaptive learning pathways; individualised pacing; content tailored to learner needs	Zawacki-Richter *et al.* (2019); Ouyang & Jiao (2021); Holmes *et al.* (2019); Garzón *et al.* (2025)
Feedback & Assessment	Immediate, automated feedback; reduced educator workload; consistency in grading	Mwakapina (2024); Kohnke *et al.* (2023); Luckin *et al.* (2016)
Learner Autonomy & Engagement	Increased motivation; self-directed learning; 24/7 access to learning support	Mbwambo (2024); Matto (2024); Yan (2025); Weng & Fu (2025)
Access & Equity	Mitigation of large class sizes; support for resource-constrained environments; access to diverse materials	UNESCO (2023); World Bank (2023); Kondoro (2025); Giannakos *et al.* (2024)
Language Learning	Vocabulary enhancement; writing clarity; comprehension support; translation assistance	Kohnke et al. (2023); Mwakapina (2024)

However, sociocultural theory also cautions that learning is fundamentally social and requires meaningful human interaction. The benefits of AI are therefore contingent upon its integration into socially rich learning environments. As Giannakos *et al.* (2024) argue, AI should augment, not replace, the social processes of teaching and learning. The evidence from Tanzanian contexts supports this view, as the most positive outcomes are reported when AI tools are used under the guidance of skilled educators who integrate them into a broader pedagogical strategy (Mwakapina, 2024; Matto, 2024).

4.2 Pedagogical and Structural Challenges in AI Integration

Despite the reported benefits, the reviewed literature identifies multiple challenges that constrain effective AI integration. These challenges operate at multiple levels, from individual user capabilities to institutional and systemic constraints. Table 4 synthesises these challenges across four key domains.

Table 4: Synthesis of Pedagogical and Structural Challenges in AI Integration

Challenge Domain	Specific Challenges	Supporting Sources
Infrastructural	Limited digital infrastructure; unreliable internet connectivity; unequal access to devices; cost of premium AI tools	AI4A (2022); Maganga & Srivastava (2025); World Bank (2023); Ondiba (2024)
Human Capacity	Low AI literacy among teachers and students; limited professional development; inadequate pedagogical training for AI integration	Garzón et al. (2025); MoEST Tanzania (2024); Luhwera (2024); MICIT Tanzania (2024)
Institutional & Governance	Uneven policy implementation; lack of clear AI governance frameworks; data privacy concerns; limited institutional readiness	UNESCO (2024); OECD (2021); Williamson (2021); United Republic of Tanzania (2025)
Ethical & Academic Integrity	Plagiarism; authorship ambiguity; student overreliance; contract cheating; misinformation from AI hallucinations	Bretag et al. (2019); Kasneci *et al.* (2023); Perkins (2023); Matto (2024); Ponera *et al.* (2024)

Structural inequalities in access to devices, connectivity, and premium AI tools are particularly pronounced in African and Tanzanian educational systems, threatening to widen the digital divide and reinforce existing educational inequities (AI4A, 2022; Maganga & Srivastava, 2025). The World Bank (2023) notes that without targeted intervention, AI risks becoming a tool that benefits well-resourced institutions while leaving under-resourced ones further behind.

Teacher preparedness and institutional readiness remain critical bottlenecks. Many institutions lack clear AI governance frameworks, professional development programs, and curricular integration strategies (Garzón *et al.,* 2025; MoEST Tanzania, 2024). Policy-oriented studies further highlight concerns regarding data privacy, algorithmic transparency, and compliance with emerging national and international AI governance frameworks (UNESCO, 2024; OECD, 2021; MICIT Tanzania, 2024). In Tanzania, the enactment of the Personal Data Protection Act introduces new obligations for educational institutions using AI platforms, yet awareness and compliance mechanisms remain underdeveloped (United Republic of Tanzania, 2025).

Academic integrity issues are widely reported. Tanzanian instructors express concern about student overreliance on AI tools, which raises questions about the authenticity of student work and the potential erosion of foundational academic literacy skills (Tang *et al.,* 2025; Matto, 2024; Ponera *et al.,*

2024). These concerns are echoed globally, with scholars documenting the rise of "*shadow pedagogies*" where students use AI without formal guidance or ethical frameworks, as adoption has outpaced institutional preparedness (Mazaheriyan & Nourbakhsh, 2025; Perkins, 2023).

From a technology mediation and acceptance perspective, the Technology Acceptance Model (TAM) explains the rapid uptake of AI tools based on perceived usefulness and ease of use (Davis, 1989). Students adopt AI for efficiency and productivity, and educators may feel pressured to permit or ignore its use due to a lack of clear institutional policy (Mbwambo, 2024; Matto, 2024). However, critical technology scholars argue that this acceptance-driven focus on utility often overlooks the deeper pedagogical and ethical implications of AI integration (Selwyn, 2016). The concept of "datafication" is pertinent here, as Williamson (2021) argues that AI systems transform educational processes into data points that can be commodified and controlled by commercial technology companies, raising concerns about institutional autonomy and data sovereignty.

From a critical pedagogy perspective, these challenges are not merely technical but are deeply political. Digital inequality, for example, reflects broader patterns of social and economic injustice (Freire, 1970; Giroux, 2011). When AI tools are adopted without addressing these underlying inequalities, they risk reproducing and even amplifying existing disparities. The lack of teacher involvement in AI governance decisions can be interpreted as a form of deprofessionalisation, where educators are excluded from shaping the technological systems that increasingly mediate their practice (Selwyn, 2016).

4.3 Pedagogical Threats and Transformative Risks

Beyond operational challenges, the reviewed studies identify deeper pedagogical threats that represent systemic transformations in cognition, pedagogy, and language ecology. These risks, summarised in Table 5, are not merely problems to be solved but fundamental shifts in the nature of education.

Several studies warn that excessive reliance on AI tools may erode critical thinking, writing competence, and problem-solving skills, particularly in language learning contexts (Tang *et al.,* 2025; Kasneci *et al.,* 2023). This phenomenon, termed cognitive deskilling, occurs when learners outsource cognitive processes to algorithmic systems, leading to epistemic passivity and a decline in the very skills that education seeks to develop (Vieriu, 2025). From a sociocultural perspective, this represents a fundamental misapplication of AI as a mediational tool. Vygotsky's (1978) concept of the ZPD requires learners to engage in productive cognitive struggle with appropriate scaffolding. If AI removes the struggle entirely by providing ready-made answers, it no longer supports development but rather replaces it, leading to superficial engagement with knowledge (Giannakos *et al.,* 2024).

Critical educational technology scholars further argue that AI redistributes epistemic authority from teachers to algorithmic systems, potentially weakening teacher professional agency and transforming the nature of pedagogical relationships (Selwyn, 2016; Williamson, 2021; Bouakaz, 2025). When students turn to ChatGPT rather than their instructor for explanations, feedback, or ideas, the teacher's role as a knowledge authority is subtly, but significantly, undermined. This shift raises fundamental questions about the future of the teaching profession and the nature of educational relationships. Atenas *et al.* (2024) conceptualise this as a form of epistemic inequality, where the knowledge legitimised by AI systems (trained on Global North datasets) is privileged over local, indigenous, and non-dominant epistemologies.

From a critical pedagogy perspective, these epistemic shifts are deeply concerning. Freire (1970) and Giroux (2011) emphasise the importance of dialogue, critical consciousness, and the co-construction of knowledge in education. Algorithmic systems, by their nature, are not capable of genuine dialogue or critical reflection. If they become the primary source of knowledge and feedback in classrooms, they risk replacing the humanising, dialogic process of education with a dehumanising, transactional one.

Table 5: Synthesis of Pedagogical Threats and Transformative Risks

Threat Category	**Specific Risks**	**Supporting Sources**
Cognitive Threats	Cognitive deskilling; erosion of critical thinking; reduced problem-solving skills; epistemic passivity; outsourcing of cognitive work	Tang *et al.* (2025); Kasneci *et al.* (2023); Vieriu (2025); Selwyn (2016); Vygotsky (1978)
Epistemic Threats	Shift in epistemic authority from teachers to algorithms; teacher deprofessionalisation; commodification of knowledge; weakening of teacher professional agency	Williamson (2021); Atenas *et al.* (2024); Bouakaz (2025); Selwyn (2016); Costa (2025)
Linguistic & Cultural Threats	Linguistic homogenisation; marginalisation of *Kiswahili* and indigenous languages; erosion of cultural identity; reinforcement of global language hierarchies	Jaffer & Sayer (2025); Adebara (2025); Ondiba (2024); UNESCO (2024); Bamgbose (2011); Makalela (2015)
Socio-Political Threats	Algorithmic bias; reproduction of epistemic inequalities; data colonialism; reinforcement of Global North epistemic dominance	Atenas et al. (2024); Jaffer & Sayer (2025); Gillani *et al.* (2023)

In multilingual contexts such as Tanzania, linguistic and cultural threats are particularly acute. AI systems disproportionately support dominant global languages, particularly English, while offering limited representation for *Kiswahili* and indigenous African languages (Jaffer & Sayer, 2025; Ondiba, 2024; Adebara, 2025). This linguistic imbalance has been conceptualised as a form of data colonialism, where Global North datasets and linguistic norms dominate AI knowledge production, marginalising local languages, knowledge systems, and cultural identities (Atenas *et al.,* 2024). As UNESCO (2024) warns, AI in education should support linguistic diversity and collective knowledge construction rather than homogenisation.

This linguistic bias has direct pedagogical consequences in Tanzanian classrooms. If AI tools are predominantly English-centric, they may implicitly devalue *Kiswahili* as a language of academic discourse and knowledge production, reinforcing colonial-era language hierarchies (Bamgbose, 2011; Makalela, 2015). Students may internalise the message that their mother tongue is less suited for academic or technical purposes, with profound implications for cultural identity and epistemic confidence.

Algorithmic bias represents another structural threat. AI systems trained on biased datasets can reproduce and amplify existing social inequalities, including those related to gender, race, and socioeconomic status (Gillani *et al.,* 2023). In educational contexts, this can manifest as biased assessment, differential recommendations, or the reinforcement of stereotypes. The "black box" nature of many AI systems makes it difficult to detect, let alone correct, such biases (Gillani *et al.,* 2023).

4.4 Integrative Synthesis and Contextual Implications

The thematic distribution of the reviewed corpus (Figure 2) indicates that scholarly discourse on AI in education is relatively balanced across pedagogical benefits (36%), challenges (34%), and transformative threats (30%). This distribution underscores that AI is simultaneously framed as a pedagogical opportunity, an implementation challenge, and a transformative risk, supporting the conceptualisation of AI as a contested pedagogical actor.

Integrating the three theoretical perspectives, this review conceptualises AI as operating on multiple levels in educational contexts:

i. *As a Mediational Tool* (Sociocultural Theory): AI can effectively scaffold learning, personalise instruction, and extend the ZPD when pedagogically guided (Zawacki-Richter *et al.,* 2019; Yan, 2025). However, its effectiveness depends on integration into socially rich learning environments that promote dialogue and cognitive struggle (Giannakos *et al.,* 2024).

ii. *As an Adopted Technology* (TAM & Critical Mediation): AI is rapidly adopted due to perceived usefulness and ease of use (Davis, 1989; Mbwambo, 2024). However, adoption driven by efficiency alone risks overlooking pedagogical consequences and may lead to AI becoming a de facto curriculum actor without adequate governance (Selwyn, 2016; Williamson, 2021).

iii. *As an Ideological and Epistemic Force* (Critical Pedagogy): AI systems are not neutral but encode cultural values, epistemic biases, and linguistic hierarchies (Atenas *et al.,* 2024). They can reinforce epistemic inequality, marginalise indigenous languages, and redistribute authority from teachers to algorithms (Jaffer & Sayer, 2025; Bouakaz, 2025).

In multilingual contexts such as Tanzania, these dynamics have profound implications. The potential benefits of AI for language learning are real and significant, particularly in resource-constrained environments (Kohnke *et al.,* 2023; Mwakapina, 2024). However, without deliberate intervention, AI integration risks exacerbating digital inequalities, marginalising *Kiswahili*, undermining teacher authority, and eroding the critical thinking skills that education seeks to cultivate. Policy frameworks and African AI scholarship increasingly emphasise the need for localised AI models, multilingual datasets, and culturally responsive pedagogies to ensure linguistic equity and epistemic justice (UNESCO, 2024; Adebara, 2025; Garzón *et al.,* 2025).

The findings of this review suggest that realising AI's potential while mitigating its risks requires a paradigm shift from technology-centric adoption to pedagogically-driven integration. This shift must be grounded in context-sensitive governance frameworks, investment in localised AI development, and the cultivation of critical AI literacy among all educational stakeholders.

5.0 Conclusions and Recommendations

This critical review has synthesised scholarly evidence on the pedagogical benefits, challenges, and transformative threats of Artificial Intelligence in education, with particular attention to language education in Tanzania and comparable multilingual contexts of the Global South. As such, by integrating critical pedagogy, sociocultural theory, and technology mediation perspectives, the study has conceptualised AI not as a neutral instructional tool but as a socio-technical and epistemic actor that actively mediates learning processes, redistributes pedagogical power, and reshapes linguistic and knowledge hierarchies. The findings demonstrate that while AI offers substantial opportunities for personalised learning, automated feedback, and enhanced access to educational resources; particularly in resource-constrained environments where large classes and limited

teaching materials are persistent challenges; these benefits are contingent upon pedagogically grounded integration and cannot be assumed to emerge from technological adoption alone. The evidence from Tanzanian higher education confirms that students value AI for its capacity to improve writing clarity, support comprehension, and enhance academic productivity, yet these same studies reveal growing concerns among educators about cognitive disengagement, academic integrity, and the erosion of foundational literacy skills when AI is used as a cognitive shortcut rather than a learning scaffold. More profoundly, the review has identified three interconnected transformative threats that demand urgent scholarly and policy attention: cognitive deskilling, where learners outsource intellectual work to algorithmic systems and thereby diminish the critical thinking and problem-solving capacities that education fundamentally seeks to cultivate; epistemic authority shifts, where teachers are increasingly marginalised as knowledge authorities and replaced by opaque algorithmic systems that lack the capacity for genuine dialogue, critical reflection, or cultural responsiveness; and linguistic homogenisation, where AI systems trained predominantly on Global North datasets privilege dominant languages such as English while marginalising *Kiswahili* and indigenous African languages, thereby reinforcing colonial-era linguistic hierarchies and threatening cultural identity and epistemic diversity. These threats are not merely theoretical possibilities but are already manifesting in educational practices, as evidenced by the emergence of "*shadow pedagogies*" where students use generative AI tools without institutional guidance or ethical frameworks, and by the documented experiences of Tanzanian educators who report student overreliance on AI-generated content at the expense of authentic intellectual engagement.

The review's integrative theoretical framework has proven essential for understanding these dynamics, as critical pedagogy illuminates the power relations and ideological assumptions embedded in AI systems, sociocultural theory explains how AI mediates cognitive development and the conditions under which it either scaffolds or supplants learning, and technology mediation perspectives reveal how adoption driven by perceived usefulness and efficiency can obscure deeper pedagogical and ethical consequences. Collectively, these theoretical lenses demonstrate that AI's impact on education is not technologically determined but is shaped by sociocultural contexts, institutional capacities, policy frameworks, and the agency of educators and learners. This understanding carries significant implications for educational policy, practice, and future research, which are elaborated below.

At the policy level, there is an urgent need for context-sensitive AI governance frameworks that move beyond generic ethical principles to address the specific linguistic, cultural, and infrastructural realities of multilingual contexts such as Tanzania. Such frameworks must mandate linguistic inclusivity by requiring that AI tools deployed in educational settings demonstrate adequate support for *Kiswahili* and indigenous languages and should incentivise the development of localised AI models trained on African datasets that reflect local epistemologies and cultural practices. The Tanzanian government's emerging National Digital Education Strategy and AI-in-Education guidelines represent important first steps, but their effectiveness will depend on robust implementation mechanisms, adequate resourcing, and meaningful stakeholder engagement that includes educators, students, and communities in shaping AI integration rather than having technologies imposed upon them. Furthermore, the enactment of the Personal Data Protection Act creates both an obligation and an opportunity for educational institutions to develop robust data governance frameworks that protect student privacy and ensure algorithmic transparency, but this requires institutional capacity building and awareness-raising that is currently uneven across the higher education sector. Policymakers must also address the digital infrastructure gap that threatens to exacerbate educational inequalities, investing in reliable internet connectivity, device access, and technical support for under-resourced institutions to ensure that AI serves equity rather than undermining it. Regional cooperation among African nations could accelerate the development of shared AI resources, including multilingual datasets and open-source educational AI tools, reducing dependence on commercial platforms that may not align with local educational values and priorities.

At the institutional level, universities and schools must invest systematically in AI literacy development for both educators and students, recognising that AI literacy is not merely technical skill but encompasses critical understanding of how AI systems work, whose interests they serve, what biases they may encode, and how they can be used ethically and effectively to support learning. This requires integrating AI literacy across the curriculum, from teacher education programmes that prepare future educators to navigate AI-mediated classrooms, to disciplinary courses where students learn to use AI tools critically and reflectively rather than passively consuming AI-generated content. Institutions should develop clear AI governance policies that address academic integrity, data privacy, and acceptable use, but these policies must be developed through inclusive processes that engage educators and students rather than being imposed top-down, as ownership and understanding are essential for effective implementation. Professional development for educators is particularly critical, as research consistently identifies limited teacher preparedness as a major barrier to effective AI integration; such development should move beyond basic technical training to include pedagogical strategies for AI integration, critical analysis of AI-generated

content, and approaches to assessment redesign that maintain academic rigour in the age of generative AI. Curriculum redesign is also imperative, particularly in assessment practices where traditional models are increasingly vulnerable to AI-generated submissions and where there is a pressing need to develop authentic, process-oriented assessments that value critical thinking, creativity, and the demonstration of learning processes over final products that can be easily automated. For language education specifically, this review underscores the importance of developing pedagogical approaches that leverage AI's capabilities for vocabulary development, writing support, and language practice while simultaneously protecting and promoting multilingualism. This includes investing in the development of *Kiswahili*-language AI tools and datasets, integrating translanguaging pedagogies that recognise and value students' full linguistic repertoires, and explicitly teaching students to critically evaluate the linguistic and cultural assumptions embedded in AI-generated content.

From an empirical perspective, this review reveals significant gaps in the literature that future research must address. There is a pressing need for longitudinal studies that track the impact of AI use on cognitive development, critical thinking, and language proficiency over time, as most existing research relies on cross-sectional self-report data that cannot capture the developmental trajectories and potential long-term consequences of AI integration. Such studies should employ mixed-method designs that combine quantitative measures of learning outcomes with qualitative exploration of how students and educators experience and navigate AI-mediated learning environments, providing rich contextual understanding alongside generalisable findings. Comparative studies across different institutional contexts within Tanzania and across African countries would illuminate how varying policy environments, infrastructural conditions, and pedagogical cultures shape AI outcomes, providing evidence for context-sensitive implementation strategies. Research is also needed on the development and evaluation of localised AI models for *Kiswahili* and other African languages, including participatory design approaches that involve educators, students, and communities in shaping technologies that meet their needs and reflect their values, rather than relying on technologies developed elsewhere that may embody cultural assumptions and linguistic biases incompatible with local contexts. Intervention studies are urgently required to test the effectiveness of different pedagogical approaches to AI integration, including professional development programmes for educators, AI literacy curricula for students, and assessment redesign initiatives, generating rigorous evidence on what works, for whom, and under what conditions that can inform evidence-based policy and practice. Additionally, research should examine the political economy of AI in education, investigating how commercial interests shape the AI tools available to educational institutions, how student data is used and potentially commodified, and what implications this has for educational autonomy and equity in African contexts. Critical discourse analysis of AI policies and guidelines at national and institutional levels would reveal the assumptions, values, and interests embedded in governance frameworks, while ethnographic studies of AI use in classrooms could illuminate the complex ways in which AI mediates teacher-student relationships and shapes classroom dynamics.

Theoretically, this review contributes to AI-in-education scholarship by advancing an integrative framework that positions AI as a socio-technical and epistemic actor, moving beyond binary narratives of AI as either beneficial or harmful to recognise that its impact is contingent, contested, and shaped by multiple interacting factors. This framework highlights the importance of examining AI not only in terms of its technical capabilities or user acceptance but also in terms of its implications for power relations, knowledge legitimacy, linguistic diversity, and the fundamental purposes of education. For scholars working in multilingual and Global South contexts, the framework provides analytical tools for interrogating how AI may reproduce or challenge colonial legacies, centre or marginalise indigenous knowledges, and expand or constrain epistemic justice. Future theoretical work should build on this foundation by developing more granular understandings of how different types of AI applications (generative language models, intelligent tutoring systems, automated assessment tools) interact with different educational contexts (disciplinary domains, levels of education, linguistic environments) to produce varied outcomes, and by exploring how concepts from postcolonial theory, decolonial thought, and African philosophy might enrich critical analyses of AI in education. The framework also invites further examination of educator and learner agency in AI-mediated environments, investigating how teachers and students can actively shape AI integration to serve their purposes rather than being shaped by it, and what forms of professional knowledge and critical consciousness this requires.

In closing, realising the potential of AI to support equitable and transformative education in Tanzania and similar contexts requires a fundamental paradigm shift from technology-centric adoption to pedagogically-driven, ethically-grounded, and culturally-responsive integration. This shift demands that educators, policymakers, technology developers, and researchers work collaboratively to ensure that AI serves educational goals rather than subverting them, that it amplifies human capabilities rather than replacing them, and that it contributes to linguistic diversity and epistemic justice rather than undermining them. The stakes could hardly be higher, for AI is not merely another educational technology but a force that is reshaping what it

means to know, to learn, and to teach in the twenty-first century. How societies in Africa and across the Global South navigate this transformation will have profound implications for the futures of education, culture, and knowledge itself. The evidence synthesised in this review suggests that with deliberate, context-sensitive, and ethically informed action, it is possible to harness AI's considerable potential while mitigating its risks, but this requires moving beyond reactive, ad-hoc responses to develop coherent, inclusive strategies that are owned by educational communities and accountable to educational values. For Tanzania, with its rich linguistic diversity, its ongoing efforts to strengthen its education system, and its emerging policy frameworks for digital transformation, the moment is opportune to chart a path that other multilingual societies can learn from; a path that embraces technological innovation while steadfastly protecting and promoting the linguistic, cultural, and epistemic diversity that is humanity's collective heritage and education's highest purpose.

Declaration of Conflict of Interest

We are hereby declaring that there are no known competing financial interests or personal relationships that could have influenced the research and findings presented in this paper.

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