https://doi.org/10.68071/2fshheat

ORIGINAL RESEARCH
Kakanchi Multidisciplinary Journal of COEASU
Vol. 1, Issue 1, 1-11, July 2026
OPEN ACCESS
E-ISSN 3156-397X

Artificial Intelligence and Teacher Education in Nigeria: Transforming Pedagogy, Policy, and Practice

[1]Torey, Mariam & [2]Habu, Saratu

[1]Directorate of Information and Communication Technology (ICT), Kaduna State College of Education Gidan Waya Kafanchan, NIGERIA
[2]Department of Computer Studies School of Secondary Education Science Program Kaduna State College of Education Gidan Waya Kafanchan, NIGERIA

Correspondence: *mariamtorey@kscoe.edu.ng*

Highlights:

Encourages AI policy mandates in Nigerian Colleges of Education, worsened by infrastructure deficits and digital literacy gaps.

Proposes the Nigerian AI-Teacher Matrix: a 3-tier model of AI literacy, low-bandwidth tools, and public-private policy alignment.

Integration of AI context-sensitive strategies that prioritize infrastructure, human development, and cultural relevance to empower rather than exclude teachers.

Received date: 7 May 2026
Revised date: 13 June 2026
Accepted date: 20 July 2026

Citation: Torey, M. & Habu, S. (2026). Artificial Intelligence Aand Teacher Education in Nigeria: Transforming Pedagogy, Policy, and Practice, 1(01), 1-11.

Abstract: While artificial intelligence (AI) is rapidly reshaping teacher education globally, a critical disconnect persists between top-down AI policy mandates and the ground-level pedagogical realities of Nigerian Colleges of Education. This paper contends that although initiatives such as the Naija Teacher AI programme demonstrate considerable promise, the existing literature inadequately addresses the systemic tension between technological capability and Nigeria's socio-infrastructural constraints. Employing a qualitative conceptual analysis and thematic synthesis of recent Nigerian educational frameworks including the National Commission for Colleges of Education (NCCE) minimum standards and the Teachers Registration Council of Nigeria (TRCN) policy reports this study examines AI integration through a dual-lens framework that simultaneously considers technological affordances and sociological imperatives. The analysis reveals that AI offers transformative potential for personalizing pre-service teacher preparation, scaling professional development, and enhancing curriculum relevance; however, persistent infrastructure deficits, digital literacy gaps, and ethical ambiguities constitute significant barriers. To bridge this divide, the paper proposes the Nigerian AI-Teacher Matrix, a three-tiered conceptual model comprising (1) core AI literacy for pre-service educators, (2) infrastructure-adaptive deployment of low-bandwidth tools, and (3) public-private policy alignment for sustained funding. The argument posits that successful AI integration demands a deliberate, context-sensitive strategy that harmonizes technological progress with social realities, prioritizes infrastructure and human development, and ensures AI functions as an instrument of empowerment rather than exclusion. Ultimately, the paper underscores that AI can transform teacher education into a learner-centred system that equips Nigerian teachers to thrive in digital classrooms while safeguarding cultural relevance and human values.

Keywords: Artificial Intelligence, Educational Policy, Pedagogical Innovation, Digital Literacy

https://doi.org/10.68071/2fshheat

Introduction

Rapid advancements in artificial intelligence are driving a fundamental transformation in the global educational landscape (Samuel, Offor & Karimu, 2025). The potential for enhancing teaching and learning has expanded significantly, ranging from adaptive tutoring systems tailored to individual student needs to generative AI tools that support curriculum development and assessment. These developments are especially significant for teacher education, the field tasked with preparing the educators who will shape future generations (Agwom, Felix & Oluseye, 2025). Consequently, the central question has shifted from whether AI will impact teacher preparation to how institutions can harness its potential while navigating its complexities. This issue is particularly urgent in Nigeria. Despite boasting over 30 million students and approximately 1.5 million teachers at the primary and secondary levels, the nation's education system continues to struggle with persistent challenges regarding quality, access, and infrastructure. Teacher education institutions, such as colleges of education and university faculties of education, bear the responsibility of training educators who can tackle these challenges and adapt to the needs of 21st-century classrooms. Incorporating AI into teacher training presents unique opportunities to tailor learning experiences, enhance pedagogical choices, and provide scalable professional development. However, it also raises significant concerns regarding equity, ethics, and the maintenance of human-centred teaching values. This work focuses on the convergence of artificial intelligence and teacher education in Nigeria, analysing both the potential for transformation and the practical barriers to integration. Building on recent policy shifts, national programmes, and emerging research, the argument posits that unlocking AI's potential demands a deliberate, context-sensitive strategy that harmonizes technological progress with social realities, prioritizes infrastructure and human development, and ensures AI functions as an instrument of empowerment rather than exclusion.

While initiatives such as the Naija Teacher AI programme demonstrate considerable promise, there is a critical disconnect between top-down AI policy mandates and the ground-level pedagogical realities of Nigerian Colleges of Education. The existing literature inadequately addresses the systemic tension between technological capability and Nigeria's socio-infrastructural constraints specifically, unreliable electricity, limited internet access, insufficient computing facilities, and low digital literacy among teacher educators themselves. Furthermore, many faculty members in teacher education institutions have limited exposure to AI tools and lack sufficient opportunities for professional development, creating a circular challenge where those tasked with preparing future teachers are themselves underprepared. This gap undermines the potential of AI to function as an instrument of empowerment rather than exclusion.

This paper presents a critical perspective on how artificial intelligence can reshape teacher education in Nigeria. It highlights AI's potential to personalize learning, enhance curriculum relevance, and support professional growth, while simultaneously reflecting on challenges such as infrastructure deficits, equity gaps, ethical considerations, and teacher readiness. The perspective emphasizes building a learner-centred, human-focused system that equips Nigerian teachers for digital classrooms without sacrificing cultural relevance or fairness.

https://doi.org/10.68071/2fshheat

Conceptual Framework: The Dual-Lens Model

The conceptual framework for this paper integrates technological and sociological perspectives to examine AI in teacher education. This framework is visually represented in Figure 1.

The technological dimension encompasses the tools, platforms, and infrastructure required for effective integration including hardware such as computers, tablets, and smart boards; software comprising AI tutoring systems, learning management platforms, and generative AI tools; and connectivity options such as internet access and mobile networks. Crucially, in the Nigerian context, technological solutions must accommodate variable connectivity, making offline-first functionality essential to ensure that rural and remote institutions are not excluded. The sociological dimension highlights human and social elements, including teacher attitudes toward AI, equitable access across regions and institutions, the cultural suitability of AI tools, and systemic preparedness for change. Research consistently demonstrates that teachers' perceptions play a significant role in technology adoption. A study of Nigerian teacher educators revealed that although they generally viewed generative AI as beneficial for curriculum enhancement, they remained cautious due to concerns regarding ethical misuse, infrastructure limitations, and the absence of regulatory frameworks (Umar & Ibrahim, 2025).

The pedagogical dimension concerns the integration of AI into teaching and learning processes. This encompasses fostering AI literacy among pre-service teachers, integrating AI tools into curriculum delivery, utilizing AI for formative assessment and feedback, and equipping educators to leverage AI for personalized learning. Crucially, pedagogical integration must extend beyond simple tool usage to cultivate critical evaluation skills that enable future teachers to assess AI-generated content, identify bias, and make informed pedagogical decisions.

The policy environment defines both the opportunities and constraints available. National AI strategies, NCCE minimum standards, and institutional and ethical frameworks serve as either enabling conditions or barriers to effective integration. When these dimensions align, they foster enhanced teacher competence in digital pedagogy, critical AI evaluation, ethical decision-making, and adaptability, ultimately leading to improved student and system outcomes such as greater learning engagement, enhanced digital literacy, reduced inequities, and contributions to national development goals (Samuel, Offor & Karimu, 2025; Agwom, Felix & Oluseye, 2025).

Methodological Approach

This paper employs a qualitative conceptual analysis and thematic synthesis of existing literature and policy documents pertaining to AI integration in Nigerian teacher education. The approach draws on the methodological conventions of conceptual analysis in education research, which emphasizes critical examination of ideas, frameworks, and their interrelationships rather than empirical data collection (Samuel, Offor & Karimu, 2025).

The inclusion criteria for literature selection focused on peer-reviewed journal articles, government policy documents, and institutional reports published between 2024 and 2026 that specifically address AI in Nigerian teacher education. Priority was given to sources examining sub-Saharan digital divides, Nigerian teacher development frameworks, and empirical studies conducted within Nigerian Colleges of Education and university faculties of education. The analysis proceeded through three stages: (1)

systematic identification of key themes across the literature; (2) critical evaluation of the technological and sociological dimensions of AI integration; and (3) synthesis of findings into a coherent conceptual model that addresses the identified gaps in current scholarship.

Thematic Analysis and Critical Discussion

Pedagogical Transformation

AI-powered adaptive learning platforms can customize educational content to match the specific needs, pacing, and learning styles of pre-service teachers. Instead of a standardized curriculum, future educators could benefit from tailored learning paths that target their specific knowledge gaps while leveraging their strengths. Intelligent tutoring systems can deliver instant feedback on assignments, simulate classroom environments for practice, and provide targeted remediation when learners encounter difficulties with key concepts. For teacher education institutions facing large student numbers and limited faculty, such tools can improve instructional quality while alleviating faculty workloads.

Generative AI tools provide teacher educators with new capabilities for designing and enhancing curricula. AI can help generate culturally relevant examples, create diverse assessment items, adapt materials for varied learners, and integrate current events and research into lessons. This ability to dynamically update the curriculum is especially beneficial in fast-evolving disciplines. Furthermore, AI-powered analytics can give teacher educators and administrators useful information about how students learn, how well teaching programmes work, and where improvements are needed. These tools can also help identify pre-service teachers who might struggle academically, allowing for early intervention. Data about programmes can show which teaching methods work best, helping schools keep improving.

The Policy Environment

The National Commission for Colleges of Education has commenced reviewing the minimum standards and curriculum for teacher education, including a focus on AI and digital skills. This reform makes AI competence a key component of teacher training (News Agency of Nigeria, 2026). Additionally, the Federal Ministry of Communications, Innovation and Digital Economy has published the National AI Strategy 2024–2028, which sets a framework for AI adoption across sectors including education. The strategy emphasizes building foundational AI infrastructure, ensuring responsible and ethical AI development, and developing a robust governance framework (Federal Ministry of Communications, Innovation and Digital Economy, 2024).

At the state level, Ogun State launched the OgunLearn platform in January 2026, an AI-powered teaching and learning system that demonstrates how AI can function effectively in real school settings (Nigerian News, 2026). Such state-level innovations complement national policy efforts and provide models for other states to emulate. The convergence of national curriculum reform, national AI strategy, and state-level implementation creates a policy environment that is increasingly conducive to AI integration in teacher education.

Socio-Infrastructural Realities

Despite the promising policy environment, significant socio-infrastructural challenges persist. Infrastructure shortcomings continue to pose a fundamental barrier. Research on vocational and technical education programmes in North Central Nigeria reveals that many Colleges of Education suffer from unreliable electricity, limited

https://doi.org/10.68071/2fshheat

internet access, and insufficient computing facilities (Agwom, Felix & Oluseye, 2025), which not only hinder the integration of digital tools but also reflect a lack of digital literacy among teacher trainers needed to demonstrate technology-enhanced pedagogy. The challenge of teacher capacity is circular, as effectively preparing teachers to use AI demands that teacher educators themselves possess AI literacy and digital pedagogy skills. However, many faculty members in teacher education institutions have limited exposure to AI tools and lack sufficient opportunities for professional development in this field.

Furthermore, the cost of internet data remains prohibitive for many institutions, meaning that AI tools for Nigeria should be designed to function without constant internet connectivity. Although these challenges are significant, they do not undermine the necessity for change. Instead, they underscore the necessity of approaches that are contextually grounded, equity-focused, and systematically implemented—attributes essential for any initiative to integrate AI into Nigerian teacher education.

https://doi.org/10.68071/2fshheat

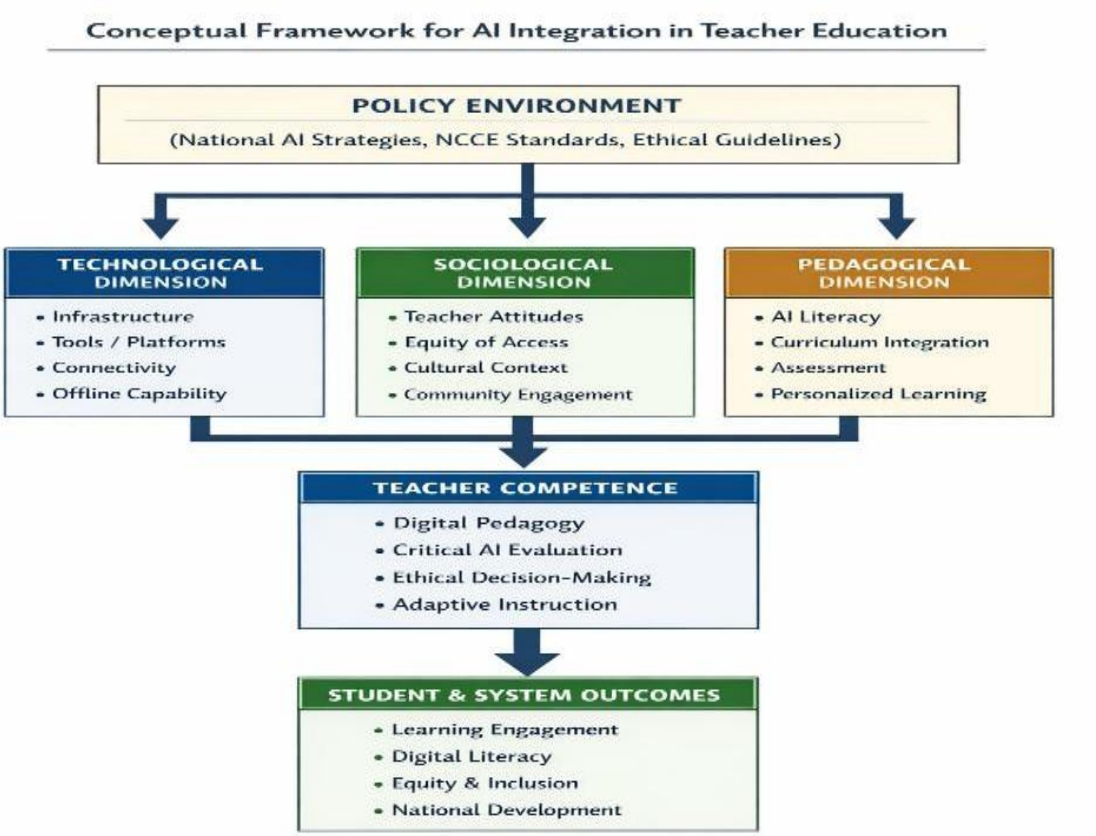


Figure 1: Conceptual Framework for AI Integration in Teacher Education
Source: Adapted from Samuel et al. (2025)

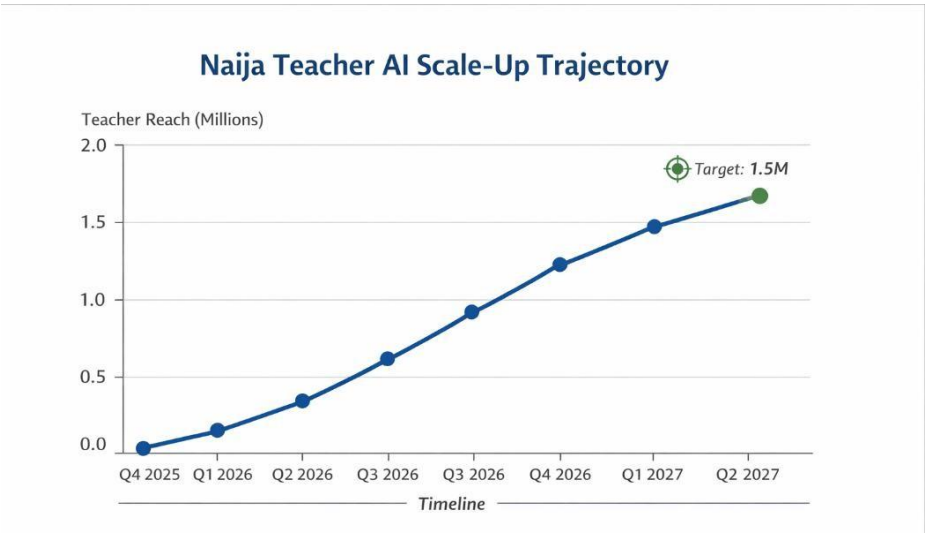


Figure 2: Naija Teacher AI Scale-Up Trajectory
Source: UNESCO SDG4 Knowledge Hub

https://doi.org/10.68071/2fshheat

AI-Powered Professional Development at Scale

The most significant advancement in Nigerian AI-enabled teacher education is the Naija Teacher AI initiative, a national programme co-implemented by the Teachers Registration Council of Nigeria (TRCN) and Gmind AI. Launched in August 2025, this ambitious two-year initiative seeks to provide 1.5 million licensed Nigerian teachers with AI-powered tools and digital training. Key features include an offline-first, mobile-ready AI platform, professional development via the Gmind AI Academy, a cascade training model, and real-time monitoring dashboards. The pilot phase successfully onboarded more than 50,000 teachers and trained 2,500 master trainers in AI pedagogy. Thirteen active communities of practice now connect over 30,000 teachers daily to share experiences and foster peer learning. Preliminary findings indicate that AI tools have reduced teachers' lesson planning and grading time by 30–50%, thereby reducing burnout and allowing for more direct engagement with students (Teachers Registration Council of Nigeria & GMind AI, 2025; UNESCO SDG4 Knowledge Hub, 2025).

For teacher education institutions, Naija Teacher AI provides a scalable, technology-driven model of professional development that complements and enhances pre-service preparation. It also offers resources—including tools, training materials, and communities of practice—that Colleges of Education can incorporate into their own programmes. Moreover, AI-based platforms can help bring teacher education to more people, especially those in remote areas who cannot attend traditional schools. Online and blended learning programmes, using AI for tutoring and giving instant feedback, can make teacher training more accessible.

The Nigerian AI-Teacher Matrix: A Proposed Conceptual Model

A rigorous concept paper must not merely identify problems; it must propose a unique conceptual solution. To address the disconnect between AI policy mandates and pedagogical realities in Nigerian teacher education, this paper introduces the Nigerian AI-Teacher Matrix—a three-tiered conceptual model designed to guide systematic, context-sensitive implementation.

Tier 1: Core AI Literacy

The foundational tier focuses on equipping all pre-service teachers with basic AI literacy, including prompt engineering, ethical data evaluation, and critical assessment of AI-generated content. This tier emphasizes that teachers should become not merely users of technology but critical evaluators of its impact. Teacher education programmes must embed AI literacy throughout all courses rather than treating it as an isolated topic. This includes basic AI knowledge, using AI in specific subjects, learning how to evaluate AI tools, and practicing using these tools in simulated classroom environments.

https://doi.org/10.68071/2fshheat

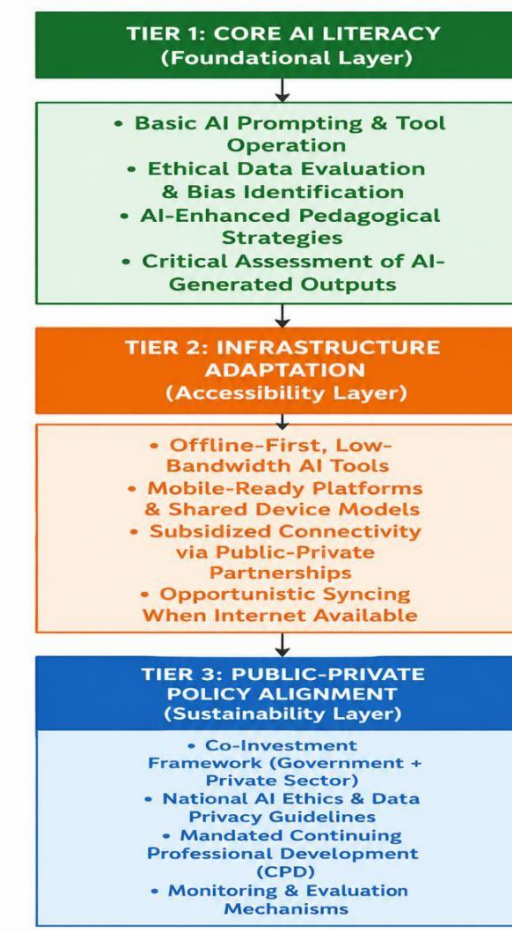


Figure 3: The Nigerian AI-Teacher Matrix
Source: Author's Proposed conceptual Model

Tier 2: Infrastructure Adaptation

The second tier addresses the infrastructural realities of Nigerian teacher education by prioritizing the deployment of low-bandwidth, offline-first AI tools. This tier recognizes that many Colleges of Education lack reliable electricity or sufficient internet for AI. Where internet exists, the cost of data remains prohibitive. Consequently, AI tools for Nigeria must be designed to function without constant connectivity. Schools should assess their current technological resources, leverage mobile devices, partner with technology companies, and seek government support to obtain needed infrastructure. Furthermore, teacher training institutions should utilize offline-capable AI platforms that can synchronize when connectivity is available, ensuring that rural and remote institutions are not excluded from AI-enabled teacher education.

Tier 3: Public-Private Policy Alignment

The third tier focuses on sustained funding models and governance structures that enable long-term AI integration. The Naija Teacher AI project exemplifies how government agencies, technology companies, international partners, and community groups can collaborate to make AI useful in education. However, such collaborations require formalized policy frameworks that clarify roles, responsibilities, and resource allocation. Schools should establish clear policies regarding AI use in teaching, learning, and assessment. These policies should cover how AI can be used safely, protect student data, ensure academic integrity, and follow ethical standards. Additionally, teacher training programmes should work with initiatives like Naija Teacher AI, connect with other institutions, team up with technology companies, and join with basic education systems to ensure their training matches what happens in classrooms.

Challenges and Risks: Navigating the Complexities

The benefits of AI in education are evident, yet significant challenges must be managed to ensure that all Nigerian teacher education institutions and students can benefit equitably.

Infrastructure and Access Gaps

The most significant obstacle to AI adoption is the lack of adequate infrastructure. Many Colleges of Education do not have reliable electricity or sufficient internet bandwidth for AI applications. Where internet connectivity exists, the cost of data remains prohibitively high. This means AI tools for Nigeria should be designed to function without constant internet access. Furthermore, concerns regarding quality and relevance complicate the matter. Although the NCE curriculum undergoes

periodic updates, it has historically failed to keep pace with changing educational needs. As recently emphasized by the Executive Secretary of the National Commission for Colleges of Education (NCCE), maintaining minimum standards that are "academically robust, practically implementable, globally relevant, and responsive to the needs of contemporary classrooms" (News Agency of Nigeria, 2026) is a matter of national importance.

Digital Literacy and Teacher Preparation

Using AI in education is not merely about having the right tools—it also requires teachers to understand how to use them effectively. Many teacher educators lack confidence or sufficient skill in using AI, which limits how well they can prepare future teachers. This problem is compounded by the rapid pace of AI development, which makes continuous professional development essential. Using AI in teacher training requires that teachers themselves understand AI and how to use it in teaching. Schools should provide teachers with ongoing training, encourage them to share knowledge, support research on AI use, and recognize innovative approaches.

Conclusion(s)

This paper has argued that artificial intelligence holds significant transformative potential for teacher education in Nigeria, yet its successful integration depends on bridging the critical disconnect between top-down policy mandates and the ground-level socio-infrastructural realities of Nigerian Colleges of Education. Through a qualitative conceptual analysis, the study examined AI integration through a dual-lens framework that considers both technological affordances and sociological imperatives. The analysis revealed that AI offers transformative potential for personalizing pre-service teacher preparation, scaling professional development, and enhancing curriculum relevance. However, persistent infrastructure deficits, digital literacy gaps, and ethical ambiguities constitute significant barriers. The paper consequently proposed the Nigerian AI-Teacher Matrix, a three-tiered conceptual model designed to guide systematic, context-sensitive implementation. Ultimately, AI is neither a panacea nor an inherent danger it is a tool whose impact depends on how it is created, used, and governed. For Nigerian teacher education, successful integration demands a deliberate, human-centred strategy that harmonizes technological progress with social realities and ensures AI functions as an instrument of empowerment rather than exclusion.

Recommendations

- **Federal Ministry of Education:** Allocate dedicated funding for AI infrastructure in Colleges of Education, prioritizing offline-capable technologies.
- **Teachers Registration Council of Nigeria (TRCN):** Scale the Naija Teacher AI initiative to encompass pre-service teacher education programmes and develop mandatory AI competency certification for licensed teachers.
- **National Commission for Colleges of Education (NCCE):** Accelerate curriculum review to embed AI and digital skills across all NCE programmes and establish minimum infrastructure standards for Colleges of Education.
- **Institutional Heads (Provosts):** Conduct institutional AI readiness audits and prioritize faculty development through dedicated budgets and peer-learning communities.

- **Private Sector Partners (Technology Companies and NGOs):** Develop low-bandwidth, offline-first AI tools designed for the Nigerian context and invest in public-private partnerships for underserved Colleges of Education.
- **State Governments:** Replicate the OgunLearn model through state-level AI-powered platforms and allocate budgets for equitable AI infrastructure across urban and rural Colleges of Education.

If these recommendations are implemented, the outcome could be transformative: a teacher education system that not only trains educators to use AI tools but also empowers them to evaluate these tools critically, adapt them to local contexts, and deploy them in service of equity and deeper learning. Such a system would honor both the potential of technology and the enduring importance of human connection in education.

Acknowledgements: The authors acknowledge the institutional support provided by Kaduna State College of Education Gidan Waya Kafanchan. The research infrastructure and academic environment facilitated the successful execution and completion of this study.

Funding Statement: This work was supported by the researchers' personal effort.

Data Availability: The analyzed data are included within the article.

Declaration: The authors declare no potential conflicts of interest, financial or otherwise, that could be perceived as influencing the objectivity or integrity of the research presented herein.

Author Contributions: Torey, Mariam did the Conceptualization & Investigation. **Habu, Saratu** did the Formal Analysis, Methodology, and Validation. The two authors support Funding Acquisition, Resources, and Project Administration. **Torey, Mariam** did the Writing of the original Draft, Writing-Review & Edit.

References

1. Agwom, S. D., Felix, O. F. M., & Oluseye, A. A. (2025). Relationship between artificial intelligence (AI) and teachers' education programmes for sustainable national development in vocational and technical education in public schools of North Central Nigeria. *Kashere Journal of Education, 9*(1), 149–169.
2. Akinwande, E. R. (2025). Generative AI and teacher education programme in Nigerian universities: Opportunities, challenges, and pathways to sustainable development. *Kashere Journal of Education, 9*(1).
3. Federal Ministry of Communications, Innovation and Digital Economy.(2024). *National AI strategy 2024-2028*.
4. IIOE Nigeria National Centre. (2025). Consensus-driven digital transformation: How the IIOE Nigeria National Centre pioneered an AI-ready academic future. *International Institute of Online Education*.
5. News Agency of Nigeria. (2025, October 12). FG reaffirms commitment to digital transformation of public schools. *NAN*.
6. News Agency of Nigeria. (2026, January 22). NCCE reviews NCE minimum standards, curriculum to boost teacher quality. *NAN*.

7. Nigerian News. (2026, January 22). Ogun launches first-of-its-kind AI-powered teaching platform. *The NEWS*.
8. Ogundele, P. (2025, August 21). Stakeholders seek policy framework for AI integration into education. *The Guardian*.
9. Samuel, N., Offor, U. I., & Karimu, A. Y. (2025). Leveraging artificial intelligence to enhance teacher competence in Nigeria's education system: Technological and sociological perspectives. *Journal of Teacher Education and Sustainable Education, 3*(1).
10. Teachers Registration Council of Nigeria & GMind AI. (2025). Naija teacher AI: An AI-powered system transforming teacher capacity at scale. *UNESCO SDG4 Knowledge Hub*.
11. Umar, F. A., & Ibrahim, M. B. (2025). Generative AI as a curriculum enhancement tool: Nigerian teacher educators' perception of scalability and risk. *Zenodo*.