

ARTIFICIAL INTELLIGENCE IN LANGUAGE EDUCATION IN NIGERIA: BALANCING TECHNOLOGICAL CREATIVITY AND ETHICAL RESPONSIBILITY

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Introduction

Language education in Nigeria is situated in a highly multilingual, culturally rich, yet socioeconomically uneven context. With more than 500 indigenous languages spoken across its diverse ethnic communities, Nigeria is one of the most linguistically heterogeneous countries in the world, as Olabisi, Soretire, and Ajayi (2023) explain. This plurality of languages presents both an asset and a challenge: while it reflects Nigeria's cultural wealth, it complicates the task of achieving uniform and inclusive educational outcomes. Historically, the dominance of English as the language of instruction has further entrenched linguistic hierarchies, marginalizing indigenous languages and limiting learners' ability to access education in their mother tongues. Adebayo, Fatai, and Asemota (2023) emphasize that this dynamic has produced a long-standing tension between global linguistic demands and local cultural identities. The arrival of Artificial Intelligence (AI) into the educational sector has opened new possibilities for addressing some of these linguistic challenges. Technologies such as large language models (LLMs), speech recognition systems, chatbots, and machine translation tools promise to enhance language pedagogy by providing multilingual learning platforms, facilitating personalized instruction, and expanding access to digital resources even in resource-constrained environments. Aremu (2024) underscores that, in theory, AI could play a pivotal role in preserving indigenous languages, enabling their integration into formal education, and democratizing knowledge across Nigeria's diverse linguistic communities.

Yet, alongside these opportunities, the integration of AI raises profound ethical concerns. Usulor, Ubi, and Nwode (2025) caution that algorithmic bias embedded in training data may reproduce linguistic inequalities, privileging English or other dominant languages at the expense of minority tongues. Concerns about data privacy and security further complicate the picture, since many AI systems require the collection and processing of sensitive information, often without adequate regulatory safeguards in the Nigerian context. According to Umoke, Nwangbo, and Onwe (2025), the absence of robust governance exposes learners and educators to risks of exploitation. Moreover, infrastructural limitations such as poor internet penetration, uneven digital literacy, and inadequate

access to devices deepen the digital divide, threatening to exclude already marginalized groups from the benefits of technological innovation. Eze, Akinola, and Uche (2021) highlight that these structural challenges underscore the danger of cultural homogenization and the potential erosion of Nigeria's rich linguistic heritage if AI tools are deployed without ethical foresight.

This paper therefore, seeks to explore the intersection of technological creativity and ethical responsibility in Nigeria's adoption of AI for language education. It argues that while AI can drive innovation and provide powerful tools for teaching, translation, and linguistic preservation, its deployment must be guided by policies, governance frameworks, and pedagogical practices that respect cultural diversity and promote

equitable access. By positioning AI not merely as a technological instrument but as a cultural and educational partner, Nigeria can chart a path toward language education that advances national goals while safeguarding its linguistic and cultural identity.

Theoretical Framework

The article is anchored on two key theoretical frameworks:

1. Sociocultural Theory of Learning

Sociocultural theory of learning was developed by Vygotsky in 1978. The theory highlights how learning is mediated by cultural tools and social interaction. In the Nigerian context, AI can act as a **mediating tool** that supports learners across diverse linguistic communities. However, if not designed inclusively, it risks privileging dominant languages and undermining local cultural practices. Thus, the theory helps explain how AI both **enables** and **constrains** language learning depending on cultural and contextual integration.

2. Critical Theory of Technology

The critical theory of technology was propounded by Andrew Feenberg in 1991 to explore how technology can be used for domination or emancipation and democratization. This perspective argues that technologies are not value-neutral; they embody the social and political choices of their creators. Applied here, AI in Nigerian language education reflects decisions about which languages are prioritized, whose cultural identities are preserved, and who gains or loses access. The theory helps interrogate issues of **power, equity, and ethics** in AI design and deployment.

Together, these frameworks allow the paper to analyse AI adoption in Nigeria as both **a creative educational innovation** and **a site of ethical negotiation**. They guide the study's central argument that Nigeria's path forward requires balancing the **innovative potential of AI** with the **responsibility to uphold cultural diversity, fairness, and inclusivity**.

Review of Literature

AI and Multilingual Education in Nigeria

Research in Nigeria has started to demonstrate both the potential and the challenges of integrating AI into a multilingual educational system. Adebayo, Fatai, and Asemota (2023) explained that tools such as **speech recognition systems and machine translation platforms** can play a transformative role in supporting the teaching and learning of indigenous languages. Their study emphasized, however, that systemic barriers—particularly inadequate technological infrastructure, insufficient funding, and the scarcity of digitized language corpora—continue to limit widespread adoption. These findings suggest that while AI presents new pedagogical possibilities, its effectiveness depends on investments that bridge the persistent resource gap in Nigeria's education sector.

Building on this perspective, Aremu (2024) underscored the promise of **AI-powered chatbots** in the revitalization of endangered Nigerian languages. According to Aremu, the design of such systems must go beyond standard computational models to engage deeply with the **linguistic and cultural specificities** of Nigerian languages. Features such as tonal recognition, syntactic flexibility, and interactive feedback mechanisms are essential for ensuring that chatbots not only transmit knowledge but also maintain learner motivation and cultural relevance. This highlights the need for an approach that blends **technological creativity with linguistic sensitivity**, positioning AI as a tool that complements rather than overrides local knowledge systems.

At the level of policy innovation, the Nigerian government has recently launched a **multilingual large language model (LLM)** that incorporates five indigenous languages alongside diverse English dialects. Broadcast Media Africa (2025) reported that this initiative signals a growing national recognition of AI's role in safeguarding cultural and linguistic identity in the digital era. This move resonates strongly with UNESCO's (2023) call for the development of AI systems that are culturally inclusive and linguistically diverse. By embedding indigenous languages in high-level AI infrastructure, Nigeria is taking a symbolic and practical step toward ensuring that technology serves as a vehicle for cultural sustainability rather than assimilation.

Taken together, these developments illustrate a dynamic but uneven landscape: Nigerian scholars and policymakers increasingly acknowledge the potential of AI in language education, yet infrastructural and design challenges persist. The lesson that emerges is clear—technological innovation must be matched with **deliberate investments in inclusivity, cultural preservation, and resource development** if AI is to meaningfully transform multilingual education in Nigeria.

Synthesis: Global and African Lessons for the Nigerian Context

Insights from other African and global contexts sharpen Nigeria's understanding of how to balance the creative possibilities of AI in education with the ethical responsibilities it demands. For instance, Mwangi (2023) in Kenya and Bekele (2023) in Ethiopia show that AI-powered translation and speech technologies can expand cross-linguistic access, but only when supported by robust digitized corpora and sustained teacher training. Nigeria faces similar barriers, as Adebayo, Fatai, and Asemota (2023) noted, given the scarcity of indigenous language databases and the lack of digital literacy among many educators. These parallels emphasize that without deliberate investment in localized resources and teacher capacity, Nigeria risks replicating the limitations observed in other African contexts.

Experiences from South Africa highlight another crucial dimension. Nkosi and Mahlangu (2024) observed that AI reading companions disproportionately benefited learners in well-resourced, urban schools while rural schools struggled with access. This mirrors Nigeria's own rural–urban divide, where infrastructural inequities already determine educational quality. If left unaddressed, AI deployment in Nigeria could reinforce rather than reduce inequality, contradicting its democratizing promise. Similarly, Ghana's experiments with AI tutors remind Nigeria of the importance of positioning technology as a support system rather than a substitute for teachers, aligning with Aremu's (2024) emphasis on AI as a pedagogical ally that respects linguistic nuance.

Global insights also expose risks of algorithmic bias and cultural homogenization that Nigeria must take seriously. Kumar and Desai (2023), examining India's AI education initiatives, show how under-documented dialects were systematically marginalized in machine translation systems. Llorens and García (2024) further demonstrate how Spanish AI models privileged dominant grammatical norms while neglecting minority forms. Nigeria's highly multilingual environment makes these warnings especially relevant. Without careful design, AI tools could prioritize major Nigerian languages like Yoruba, Hausa, or Igbo at the expense of minority tongues, thereby eroding cultural diversity. UNESCO (2023) has stressed that inclusive AI design must ensure fair representation of linguistic diversity, while the World Bank (2022) underscores the need for strong governance frameworks that can anticipate and mitigate such ethical risks.

Taken together, these African and global experiences sharpen the central argument of this article: while AI represents an extraordinary opportunity for Nigeria to creatively expand multilingual education, it also demands ethical responsibility in deployment. The Nigerian context requires a dual approach—investing in localized linguistic infrastructure and equitable access, while embedding governance frameworks that protect against bias, exclusion, and privacy violations. By balancing technological creativity with ethical foresight, Nigeria can position AI not simply as an imported innovation, but as a culturally grounded educational partner that sustains both learning outcomes and linguistic heritage.

Discussion

The ways Artificial Intelligence Tools and Applications Create New Opportunities for Language Education in Nigeria

Artificial Intelligence (AI) is creating new opportunities for language education in Nigeria by transforming how local and endangered languages are taught, learned, and preserved. AI-powered translation tools and speech technologies (like text-to-speech and speech recognition) enable learners to access materials and practice pronunciation in indigenous languages such as Yoruba, Igbo, and Hausa. Chatbots and localized language models act as virtual tutors, providing interactive learning experiences and helping to document cultural expressions.

Additionally, AI supports corpus building and digitization—collecting, processing, and preserving texts, audio recordings, and oral histories that form the foundation for teaching and revitalizing languages. Automated assessment and adaptive learning systems personalize instruction, improving language retention, while AI-driven content creation allows educators to develop culturally relevant stories, games, and lessons. By facilitating community-based data collection and open-source collaboration, AI also empowers local speakers to take part in the preservation and promotion of their linguistic heritage.

In essence, AI offers Nigeria a powerful platform to expand multilingual education, modernize instruction, and safeguard its linguistic diversity for future generations.

Ethical Challenges Associated with AI Applications

The use of Artificial Intelligence in Nigerian language education also raises several ethical challenges. Algorithmic bias is a major concern, as many AI systems are trained on datasets dominated by global or Western languages, which can marginalize indigenous tongues and reinforce linguistic hierarchies. Data privacy is another issue—AI tools often collect voice, text, or personal information from users without clear consent or local data protection frameworks.

There is also the risk of cultural loss, where automated systems simplify or distort cultural meanings embedded in native languages, eroding their authenticity. Digital inequity further compounds these problems, as unequal access to internet infrastructure, devices, and technical literacy can exclude rural or underprivileged communities from benefiting from AI-driven education.

Altogether, these challenges highlight the need for ethical guidelines, inclusive data practices, and community involvement to ensure AI strengthens rather than undermines Nigeria's linguistic and cultural diversity.

Policy, Pedagogical and Technological Strategies for Integrating AI in Nigeria's Multilingual Educational System

To ensure that Artificial Intelligence is integrated into Nigeria's multilingual educational system in a culturally sensitive, fair, and inclusive way, several strategies are needed across policy, pedagogy, and technology.

Policy strategies should include developing national AI and language education frameworks that prioritize indigenous languages, enforce data privacy, and promote the ethical AI use. Government partnerships with universities, tech firms, and local language communities can support open data initiatives and ensure equitable distribution of resources.

Pedagogical strategies should focus on teacher training and curriculum reform. Educators need digital literacy skills to use AI tools responsibly, adapt materials to local contexts, and encourage bilingual or multilingual learning. Culturally grounded content should be emphasized to maintain linguistic authenticity and community relevance.

Technological strategies involve investing in local AI research and infrastructure to develop tools tailored to Nigeria's linguistic realities. Supporting open-source projects, low-resource language modeling, and community-driven data collection can enhance inclusivity. Combining these approaches ensures AI becomes a tool for empowerment—preserving Nigeria's linguistic diversity while promoting innovation and educational equity.

The synthesis of literature and policy analysis reveals that Nigeria stands at a critical juncture in its pursuit of integrating Artificial Intelligence into language education. On one hand, the creative potential of AI is undeniable. As Adebayo, Fatai, and Asemota (2023) demonstrated, tools such as chatbots, machine translation systems, and speech recognition technologies can expand access to indigenous languages and enhance pedagogical practice. Similarly, the launch of Nigeria's multilingual large language model reflects a forward-looking effort to embed cultural identity into technological advancement (Broadcast Media Africa, 2025). These developments illustrate how AI can serve as a powerful enabler for linguistic preservation, democratizing education, and revitalizing endangered languages.

Yet, the ethical risks remain significant. Without adequate oversight, algorithmic bias threatens to reinforce linguistic hierarchies by privileging English and marginalizing minority tongues, as researchers from the Nigerian Journal of Social Policy (2023) cautioned. Issues of data privacy further complicate the landscape, with existing Nigerian frameworks lacking AI-specific provisions to secure sensitive educational data (ThisDayLive, 2025). Furthermore, the persistent digital divide—particularly between urban centers and rural schools—raises concerns about inequitable access, potentially excluding already disadvantaged learners (Connect Nigeria, 2024).

These realities highlight that innovation without responsibility risks deepening the very inequalities that AI is often celebrated for mitigating.

Learning from both African and global contexts underscores the need for a dual agenda. Countries like Kenya and South Africa have begun experimenting with AI-enabled multilingual platforms, combining technological innovation with policies that prioritize equity (African Union, 2022). Globally, UNESCO (2023) has called for rights-based AI strategies that safeguard cultural heritage while advancing educational goals. For Nigeria, these insights point to the necessity of pairing creativity with responsibility.

- **Creativity** involves sustained investment in local AI innovation that reflects Nigeria's multilingual realities, including the digitization of indigenous languages and the development of context-sensitive tools tailored to local learners.
- **Responsibility** requires embedding ethical safeguards through policy reforms, inclusive system design, and infrastructural development that ensures no community is left behind.

Positioning AI as both a technological tool and a cultural partner allows Nigeria to move beyond a purely utilitarian view of digital innovation. Instead, it places AI within the broader project of nation-building, where technological creativity is balanced with ethical responsibility. By adopting this approach, Nigeria can ensure that AI strengthens, rather than erodes, its linguistic diversity, cultural identity, and commitment to equitable education.

Conclusion

Artificial intelligence carries immense potential to reshape language education in Nigeria by facilitating multilingual learning environments, promoting the preservation of indigenous languages, and expanding access to digital educational resources. Yet, unlocking these opportunities demands more than technological enthusiasm; it requires a careful negotiation between innovation and ethical responsibility. If uncritically deployed, AI tools could reproduce linguistic hierarchies, deepen digital divides, and marginalize underrepresented communities. Conversely, when guided by sociocultural awareness and critical technology perspectives, AI can serve as a catalyst for inclusive and context-sensitive language education. This article underscores the importance of adopting approaches that are not only technologically advanced but also socially just, ensuring that Nigeria's diverse linguistic and cultural heritage is protected while expanding educational equity in the digital age.

Recommendations

1. National AI Policy for Language Education

The Federal Ministry of Education should establish a national policy that embeds ethical safeguards—data privacy, fairness, and cultural representation—while promoting indigenous language use and multilingual education. This will align Nigeria's schools with global standards while ensuring local linguistic needs are protected.

2. Bridge the Digital Divide

Government and private partners must expand digital infrastructure, including broadband, electricity, and device access, particularly in rural areas. Without such investments, AI adoption risks deepening inequalities in language learning outcomes.

3. Teacher AI Literacy and Ethics Training

Professional development should equip educators with AI literacy skills, including bias recognition, privacy protection, and critical evaluation of outputs. Well-trained teachers are essential for maximizing AI's benefits while minimizing ethical risks.

4. Inclusive AI Design

AI developers must integrate indigenous languages, dialects, and cultural content into training datasets. Such inclusivity will prevent linguistic bias and ensure Nigeria's cultural diversity is reflected in digital education tools.

5. **Strengthen Regulation and Oversight**
Clear frameworks should govern AI use in education, with mechanisms for bias auditing, decision transparency, and user recourse. Regulatory oversight is key to safeguarding equity and accountability.
6. **Stakeholder Engagement**
Teachers, students, parents, and language communities should be part of AI design and implementation. Their input will make AI tools more culturally relevant, practical, and widely accepted.
7. **Continuous Research and Monitoring**
Ongoing research should track AI's effects on equity, cultural preservation, and student achievement. Regular evaluation will allow policy and practice to adapt quickly to emerging risks and opportunities.

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