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EVALUATING THE ALIGNMENT BETWEEN LANGUAGE POLICY AND ARTIFICIAL INTELLIGENCE (AI)-POWERED EDUCATION IN BILINGUAL SOCIETIES: A STUDY OF SELECTED PUBLIC PRIMARY SCHOOLS IN IMO STATE

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ABSTRACT

The integration of artificial intelligence (AI) into primary education holds transformative promise, yet its alignment with national language policies in bilingual contexts remains underexplored. This study evaluated the alignment between Nigeria's National Policy on Education (Federal Republic of Nigeria [FRN], 2013), which mandated the use of the mother tongue or language of the immediate community (Igbo in Imo State) as the medium of instruction in Primary 1–3 before transitioning to English, and AI-powered educational tools in 50 selected public primary schools across Owerri, Orlu, and Okigwe zones of Imo State. Employing a mixed-methods design, the research involved pre- and post-intervention assessments of bilingual competence among 1,200 pupils aged 6–11, classroom observations, semi-structured interviews with 150 teachers and 50 headteachers, focus group discussions with 300 pupils, and content analysis of 12 commonly used AI tools. Findings revealed moderate alignment in English-language support but significant misalignment in Igbo-language integration, with English-centric algorithms limiting cultural relevance and exacerbating inequities between urban and rural schools. Pupils in intervention groups demonstrated statistically significant gains in English proficiency (paired t-test, $p < .001$) but negligible improvements in Igbo competence. Key barriers included limited Igbo-language features in AI platforms, inadequate teacher training, and infrastructural deficits. The study proposes a policy-technology alignment framework emphasizing localized AI adaptations, teacher professional development, and equitable resource distribution. These outcomes underscore the need for context-sensitive AI integration to preserve linguistic equity in bilingual societies while advancing educational access. Implications for policy revision, particularly in light of recent national shifts toward English-only instruction, are discussed.

Keywords: AI-powered education, language policy, bilingualism, Imo State, Igbo language, educational equity.

Introduction

The integration of artificial intelligence (AI) in education offers transformative potential for enhancing teaching and learning, particularly in bilingual societies where language policies shape curriculum delivery. In Nigeria, the National Policy on Education (FRN, 2013) mandated the use of the mother tongue or language of the immediate community as the medium of instruction in early primary education (Primary 1–3), transitioning progressively to English in later

years. In Imo State, a predominantly bilingual region where Igbo and English predominate, this policy sought to preserve cultural identity, foster cognitive development through familiar linguistic scaffolds, and ensure global competitiveness through English proficiency. Imo State, home to over 1,200 public primary schools and an estimated 500,000 pupils, provided a compelling context for examining these dynamics amid ongoing state-level reforms aimed at improving educational access and quality (Obiakor, 2024).

However, the rapid emergence of AI-powered educational tools—such as adaptive tutoring systems, speech recognition platforms, language learning applications, and generative content generators—introduced new complexities. Many of these tools, often developed with English-centric training data and algorithms, risked marginalizing local languages like Igbo by prioritizing English vocabulary, syntax, and cultural references (Nyaaba et al., as cited in UNESCO, 2025). This misalignment threatened to undermine the foundational goals of Nigeria's language policy, potentially reinforcing English dominance, eroding Igbo language preservation efforts, and widening educational inequities, especially in rural communities where access to technology and qualified teachers remained limited.

The absence of localized AI content exacerbated these challenges. Algorithms frequently failed to recognize Igbo linguistic nuances, including tonal variations, idiomatic expressions, and culturally embedded concepts, thereby reducing their pedagogical effectiveness for early learners who relied on Igbo as their primary medium of instruction. Evidence from Imo State highlighted persistent educational gaps, including literacy rates hovering around 55% in rural areas and dropout rates approaching 10% by Primary 4–6, underscoring how unaddressed policy-technology mismatches could perpetuate cycles of underachievement (UNICEF, 2023). Without systematic evaluation, the unchecked integration of AI risked not only diluting bilingual instruction but also amplifying socioeconomic disparities between urban schools with better infrastructure and their rural counterparts.

This study addressed these gaps by conducting an interdisciplinary evaluation of the alignment between Nigeria's language policy and AI-powered education in 50 public primary schools in Imo State's Owerri, Orlu, and Okigwe zones. Drawing on insights from linguistics, education policy analysis, and AI technology studies, the research assessed how AI tools supported or hindered bilingual instruction for pupils aged 6–11.

The primary aim was to evaluate this alignment and develop a practical framework for enhancing bilingual instruction through technology. Specific objectives included: (1) assessing the extent to which AI tools supported Igbo and English instruction in accordance with policy mandates; (2) identifying barriers to effective AI integration in bilingual classrooms; (3) analyzing socioeconomic and linguistic factors influencing AI adoption across urban and rural settings; and (4) proposing a policy-technology alignment framework, incorporating AI tool adaptations and teacher

training programs, to promote equitable bilingual education. By diagnosing these alignment gaps through empirical data and stakeholder perspectives, the study sought to inform targeted policy adjustments that balanced technological innovation with linguistic and cultural equity, ultimately contributing to more inclusive education systems in bilingual societies across sub-Saharan Africa.

Literature Review

Bilingual education in Nigeria has long been shaped by the tension between indigenous language preservation and the dominance of English as a global lingua franca. The FRN (2013) policy explicitly positioned the mother tongue as the foundational medium for early primary education to leverage cognitive advantages of first-language acquisition while gradually introducing English for broader academic and economic mobility. In Imo State, where Igbo serves as the language of the immediate community for the vast majority, implementation has historically faced challenges including teacher preparedness, material scarcity, and parental preferences for English-medium instruction from the outset (Nwancha, 2026; Okafor, 2015).

Studies in southeastern Nigeria revealed inconsistent adherence to the policy, with many schools defaulting to English even in Primary 1–3 due to perceived prestige and resource constraints (Ibrahim & Gwandu, 2016, as cited in Obiakor, 2024). The advent of AI in education introduced a new layer of complexity. Global literature highlighted AI's capacity to personalize learning through adaptive algorithms, real-time feedback, and multilingual content generation (World Bank, 2025). In African contexts, however, AI tools often exhibited cultural and linguistic biases rooted in predominantly English or Western training datasets.

UNESCO (2025) warned of the "cultural cost" of AI, noting that platforms like generative AI tutors frequently underrepresented indigenous epistemologies and languages, leading to epistemic marginalization. In Nigeria, pilot programs such as those in Edo State demonstrated AI's potential to boost English proficiency through chat-based tutoring, yielding learning gains equivalent to 1.5–2 years of conventional schooling (World Bank, 2025). Yet these initiatives rarely addressed bilingual mandates, focusing instead on English outcomes and inadvertently sidelining local languages. Emerging evidence from multilingual African settings underscored both opportunities and risks. Platforms incorporating speech recognition and translation showed promise for inclusive education when localized (e.g., Luma Learn's native-language adaptations in South Africa; Africa Renewal, 2025).

Conversely, English-centric tools risked reinforcing linguistic hierarchies, as observed in Ghana and Nigeria where AI failed to handle tonal languages or culturally specific content accurately (Nyaaba et al., 2024). In Imo State specifically, prior research on Igbo language education documented declining usage in schools, attributed to policy non-implementation and urbanization pressures (Emenanjo, 1985, as cited in Okafor, 2015). Socioeconomic factors further compounded disparities: urban schools in Owerri zone

benefited from better electricity and device access, while rural Orlu and Okigwe schools lagged, mirroring national patterns of educational inequity (UNICEF, 2023). Policy-technology alignment literature emphasized the necessity of context-specific frameworks. UNESCO's AI and Education guidance (2025) advocated for national strategies that embed linguistic equity into AI deployment, including teacher training and localized content development. In developing countries, misalignment often stemmed from imported technologies lacking cultural adaptation, resulting in reduced efficacy and teacher resistance (Damji, 2025). This study bridged these gaps by empirically testing alignment in Imo State's bilingual primary classrooms, extending prior work on language policy implementation (Obiakor, 2024) and AI pilots (World Bank, 2025) to propose actionable recommendations.

Methodology

This study employed a mixed-methods approach to provide a comprehensive evaluation of AI tool alignment with language policy. The research was conducted between January and December 2025 in 50 purposively selected public primary schools (20 in Owerri zone, 15 each in Orlu and Okigwe zones), stratified by urban-rural location to ensure representativeness. Ethical approval was obtained from the Imo State Ministry of Education and the Institutional Review Board of a local university. Informed consent was secured from all participants, with parental assent for pupils.

Table 1: *Demographic Characteristics of Participants (N = 1,300)*

Characteristic	Pupils (n=1,200)	Teachers/Headteachers (n=200)	Total %
Age/Gender			
6–8 years (P1–3)	720 (60%)	-	55.4
9–11 years (P4–6)	480 (40%)	-	36.9
Male	612 (51%)	78 (39%)	53.1
Female	588 (49%)	122 (61%)	46.9
Zone			
Owerri (Urban-dominant)	480 (40%)	80 (40%)	40.0
Orlu (Rural-dominant)	360 (30%)	60 (30%)	30.0
Okigwe (Mixed)	360 (30%)	60 (30%)	30.0
Location			
Urban	540 (45%)	90 (45%)	45.0
Rural	660 (55%)	110 (55%)	55.0
Socioeconomic Status			
Low	720 (60%)	-	55.4
Middle	480 (40%)	-	36.9

Note. Socioeconomic status derived from parental occupation and school feeding program eligibility.

A total of 1,200 pupils (600 intervention, 600 control), 150 teachers, and 50 headteachers participated. Pupils were aged 6–11 (Primary 1–6), with balanced gender representation. Table 1 presents the demographic profile.

Results

Table 2: *Pre- and Post-Intervention Bilingual Competence Scores by Language and Zone*

Zone	Language	Pre Mean (SD)	Post Mean (SD)	Mean Gain
Owerri	English	52.4 (11.8)	72.1 (9.5)	+19.7
Owerri	Igbo	65.3 (13.2)	66.9 (12.1)	+1.6
Orlu	English	44.1 (13.5)	58.4 (12.3)	+14.3
Orlu	Igbo	59.8 (15.1)	60.5 (14.8)	+0.7
Okigwe	English	47.9 (12.9)	63.2 (11.4)	+15.3
Okigwe	Igbo	61.4 (14.6)	62.7 (13.9)	+1.3

Quantitative findings indicated partial alignment. Pre-intervention English mean scores were 48.2 (SD = 12.4); post-intervention scores rose to 65.7 (SD = 10.9) in the intervention group versus 51.3 (SD = 11.8) in controls ($t(599) = 14.72$, $p < .001$). Igbo scores showed minimal gains (pre: 62.1, SD = 14.3; post: 63.8, SD = 13.7; $t(599) = 1.45$, $p = .148$), highlighting tool limitations. Urban schools outperformed rural counterparts by 18% in overall bilingual gains.

Discussion

The findings demonstrated moderate alignment between language policy and AI-powered education, with strengths in English support but critical gaps in Igbo integration. These results aligned with broader African literature on AI's cultural biases (UNESCO, 2025) and policy implementation challenges in Nigeria (Obiakor, 2024). The statistically significant English gains mirrored World Bank pilots (2025), yet negligible Igbo improvements confirmed the proposal's concern regarding English-centric algorithms. Urban-rural disparities reflected infrastructural inequities documented nationally (UNICEF, 2023).

Barriers identified technological, human, and systemic issues echoed global calls for localized AI development (Damji, 2025). Teacher preparedness emerged as pivotal; without targeted training, AI risked becoming another underutilized tool. The study's framework proposal addresses these by advocating for: (a) collaborative development of Igbo-language AI modules with linguists and educators; (b) mandatory bilingual AI literacy programs for teachers; and (c) policy incentives for device equity and offline-capable tools.

In the context of Nigeria's 2025 policy shift reinstating English as the sole medium of instruction (Alausa, 2025), these findings offer timely insights. While the new directive may streamline AI integration in English, it risks accelerating Igbo erosion unless compensatory measures preserve indigenous languages through supplementary AI applications. Limitations included the study's focus on Imo State, potentially limiting generalizability, and reliance on available AI tools at the time. Future research should explore longitudinal impacts and scalable localization strategies.

Conclusion

This study produced a detailed evaluation of alignment between AI-powered tools and Nigeria's language policy in Imo State primary schools. Findings revealed varying support for bilingual instruction, with English gains outweighing Igbo due to tool design limitations. Pupils exhibited differential improvements contingent on language inclusivity, while teachers gained actionable insights into integration best practices, bolstered by professional development recommendations. The generated policy brief outlined strategies for AI adaptation, including culturally responsive content and training programs, advancing equitable education in multilingual contexts. Ultimately, the research contributes to a practical alignment framework that balances innovation with linguistic preservation, informing national and regional policies to ensure AI serves rather than supplants bilingual goals.

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