

Qualitative Study on Integrating Artificial Intelligence Technology into Language Teaching and Learning in Nigeria

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Abstract

The field of language education is changing as a result of artificial intelligence (AI), which is bringing in a new era of international communication, intelligent tutoring, adaptive learning, and immediate feedback. As AI-driven learning platforms, automated assessment systems and sophisticated language models develop, they make it possible to provide highly customized training that meets the needs of each individual student, encourages self-reliance, and sustains engagement. AI improves learner outcomes and teaching effectiveness while also increasing access to high-quality language training across socioeconomic and geographic barriers, according to recent studies in educational technology. AI's transformational potential must be carefully weighed against ethical and pedagogical caution, though. Data privacy, algorithmic bias, digital equity and redefining teacher roles are all complicated issues that need careful consideration. If left unchecked, these problems could endanger students' rights, perpetuate inequality, and threaten the humanistic principles that are at the heart of education. Therefore, this study explores the various pedagogical possibilities of AI in language instruction and challenges the moral conundrums associated with its use. Drawing on ethical frameworks and human-centered educational concepts, it offers evidence-based approaches for integrating AI in a sustainable, inclusive and accountable manner. The main objective is to promote an AI-assisted language learning ecosystem in which human agency, creativity and meaningful engagement are enhanced rather than replaced by technology. It is recommended that educational institutions and regulatory agencies should put in place clear policies pertaining to data governance, permission, privacy, transparency and responsible AI use.

Keyword: Artificial intelligence, Language teaching, Ethical AI

Introduction

Artificial Intelligence (AI) has quickly developed into a crucial and revolutionary force in modern language teaching, changing how teachers plan, create, present, and evaluate lessons as well as how students acquire language proficiency. According to Zawacki-Richter et al. (2023), the incorporation of AI into language learning offers a change from static, teacher-centered education to dynamic, learner-centered, and adaptable learning experiences. By utilizing advanced Natural Language Processing (NLP) algorithms, Intelligent Tutoring Systems (ITS), conversational agents (chatbots), and Automatic Speech Recognition (ASR) technologies, artificial intelligence (AI) builds intelligent ecosystems that monitor progress, customize instruction, and offer support according to learner profiles (Wang & Vásquez, 2023; Lin & Warschauer, 2023). By analysing learners' spoken or written input using large language datasets and machine learning approaches, these systems are able to detect faults in pronunciation, grammar, semantics, and pragmatics with an accuracy that is not possible with traditional methods (Holmes et al., 2022). AI enables students to practice both productive (speaking and writing) and receptive (listening and reading) language abilities at their own speed by providing real-time, personalized scaffolding and corrective feedback. This adaptive feedback method fosters learner autonomy, intrinsic motivation, and sustained engagement in addition to improving accuracy and fluency (Wang & Vásquez, 2023; Beatty, 2019). Learners that engage



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with intelligent systems receive ongoing diagnostic feedback that promotes self-control, introspection, and goal-oriented development, resulting in more significant and long-lasting language acquisition (Li et al., 2022). According to Holmes et al. (2022), Zawacki-Richter et al. (2023), Sun and Zhang (2024), and other scholars, Artificial Intelligence (AI) is redefining second-language pedagogy by supporting data-driven, adaptive, and evidence-based instructional models that react dynamically to learner performance, linguistic challenges, and cognitive needs. By analysing vast amounts of learner data, these intelligent systems can spot trends in misconceptions or developmental mistakes, which enables teachers to improve their methods, personalize their resources, and create more focused interventions. As a result, AI allows for more effective use of instructional time and resources by changing the educator's position from that of a mere information transmitter to that of a facilitator, learning designer, and data-informed mentor (Lin & Warschauer, 2023; Holmes et al., 2022). Additionally, by creating realistic, dynamic, and context-rich experiences, AI-powered multimodal learning environments that incorporate speech, text, visuals, gestures, and immersive simulations expand the possibilities for language acquisition (Chiu et al., 2023). For example, learners can participate in simulated real-world interactions, cultural exchanges, and situational tasks that replicate genuine communicative environments through virtual and augmented reality applications (Gong et al., 2022). These encounters help students internalise language use beyond rote memorization by fostering international competency and pragmatic fluency. AI-driven platforms reduce geographical and temporal barriers in open and distance learning (ODL) environments by providing various populations of learners with flexible, on-demand, and personalised learning opportunities (Wang & Vásquez, 2023; Zawacki-Richter et al., 2023). Furthermore, intelligent language learning tools are becoming more widely available worldwide thanks to the convergence of AI with mobile technologies and cloud computing, which promotes inclusive education and lifelong learning (Beatty, 2019; Sun & Zhang, 2024). Inequalities in access to high-quality language instruction have decreased thanks to the availability of advanced virtual tutors, pronunciation coaches, and interactive writing assistance for learners in remote places. Through automated essay scoring, voice evaluation, and adaptive testing, AI also makes large-scale assessment possible, offering reliable and timely insights into student competence levels (Li et al., 2022; Holmes et al., 2022). All things considered, artificial intelligence is a revolutionary force in contemporary language instruction, creating a more adaptable, dynamic, and customized learning environment. AI improves language learning's effectiveness and accuracy by fusing cognitive science, computational linguistics, and educational psychology. It also supports the larger educational goal of equity, accessibility, and learner empowerment in the digital era. Its ongoing development holds the potential to further transform language teaching by providing educators and students with cutting-edge resources for attaining linguistic proficiency in a world growing more interconnected by the day (Zawacki-Richter et al., 2023; Wang & Vásquez, 2023).

Notwithstanding these encouraging developments in education, an increasing amount of research highlights the moral, philosophical, and professional conflicts that arise when artificial intelligence (AI) is used into language instruction. AI technologies raise important issues about data ethics, accountability, and human agency in educational environments, even as they promise increased efficiency and personalization (Selwyn, 2022; Williamson & Piattoeva, 2023). Data ownership and privacy are major problems, especially for AI systems that gather and analyze large volumes of learner-generated data for assessment and adaptive learning (Holmes et al., 2022; Sun & Zhang, 2024). There are still issues with algorithmic decision-making's transparency because many AI models function as "black boxes," making it challenging for teachers and students to comprehend how outputs like grades or feedback are produced (Selwyn, 2022; Knox, 2020). In educational evaluation, this opacity calls into question the values of accountability, justice, and trust. Furthermore, researchers have warned that AI systems may reinforce linguistic hierarchies, perpetuate algorithmic bias, and marginalize minority language varieties and cultural identities if they are trained primarily on data from dominant linguistic and cultural groups (Williamson & Piattoeva, 2023; Li et al., 2022). For instance, text-generation and voice recognition algorithms frequently perform poorly for speakers with non-standard accents or dialects, thereby favouring dominant linguistic norms and preventing marginalized learners from fully participating. If left unchecked, these biases run the risk of perpetuating rather than reducing current injustices, undercutting the inclusive goals of open and global education. The identity, autonomy, and professional agency of teachers are further areas of concern. Teachers' professional duties may be redefined when AI takes on more tasks including evaluation, feedback generation, and lesson planning (Holmes et al., 2022; Knox, 2020). According to Selwyn (2022) and Williamson & Piattoeva (2023), some academics caution that an over-reliance on AI could reduce teachers' authority and pedagogical inventiveness, turning them into managers of algorithmic systems rather than thoughtful practitioners and decision-makers. This conflict highlights the need for educational intentionality, ethical thinking, and human oversight in AI-mediated learning environments. AI-driven educational ecosystems have the potential to reinforce systemic injustices, favour technologically advanced areas, and jeopardise students' digital rights if they are not properly governed (Sun & Zhang, 2024). These dangers underscore the critical need for inclusive policy mechanisms, ethical design principles, and transparent governance frameworks to guarantee accountability and equity in the application of AI in a variety of linguistic and cultural contexts. As a result, current debate demands a critical and balanced viewpoint that upholds pedagogical ethics, human-centered values, and fair access to digital learning resources while embracing AI's revolutionary potential (Selwyn, 2022; Holmes et al., 2022). Therefore, in order to properly utilise AI's potential and



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guarantee that technological innovation in language instruction stays egalitarian, culturally sensitive, and sustainably aligned with fundamental educational principles, a thorough and nuanced examination is necessary.

Opportunities of AI in Language Teaching and Learning in Nigeria

Personalised and Adaptive Learning in Nigeria

The ability to personalise language learning environments in Nigeria has been greatly improved by artificial intelligence (AI), which has changed how students engage with educational materials and how teachers perceive individual differences in learning. Large amounts of learner-generated data, including response accuracy, pacing, error patterns, and cognitive engagement metrics, can be analyzed by AI-powered systems to create customized learning pathways that dynamically modify the difficulty, modality, and order of learning tasks (Wang & Vásquez, 2023). These systems enable real-time modification of content and activities in Nigerian classrooms in accordance with each learner's changing needs and goals by continuously assessing learner input and performance. This degree of responsiveness represents a paradigm shift from uniform instructional delivery to data-driven personalization, enabling learners to experience tailored instruction comparable to one-on-one human tutoring. Prominent language-learning platforms like Duolingo, Babbel, and Rosetta Stone are prime examples of how machine learning and natural language processing algorithms are used to track learner performance, forecast proficiency trajectories, and offer focused exercises that fill in particular skill gaps in vocabulary, grammar, or pronunciation (Wang & Vásquez, 2023; Li et al., 2022). By identifying strengths and weaknesses using learner analytics, these adaptive systems provide reward and remedial feedback to maintain the ideal degree of difficulty. As learners gain instantaneous, data-driven insights about their own development and performance patterns, the ongoing adaptation not only improves accuracy and fluency but also cultivates metacognitive awareness (Holmes et al., 2022; Lin & Warschauer, 2023). Beyond ease of use, AI-driven personalization encourages students to take charge of their education, which supports self-regulated learning. AI helps maintain motivation and engagement by addressing learners at their current proficiency level and gradually scaffolding tasks toward more sophisticated linguistic and communication competencies. By ensuring that instructional input is in line with the learner's zone of proximal development, this personalized trajectory lowers frustration and cognitive overload, two common obstacles in second-language acquisition (Vygotsky, 1978; Sun & Zhang, 2024). Additionally, by offering instant rewards and progress tracking, gamification features, which are frequently incorporated into AI-based platforms, improve emotional engagement and perseverance, reinforcing positive learning behaviors and intrinsic motivation (Beatty, 2019). These benefits are supported by empirical studies, which demonstrate that AI-powered adaptive learning environments increase student motivation, enhance information retention, and increase overall learning efficiency (Holmes et al., 2022; Li et al., 2022). Further research has shown that the personalized and multimodal nature of AI-assisted learning, which combines text, audio, and interactive simulations, allows for differentiated support that is as responsive and scalable as traditional human-mediated instruction, and in some cases even better (Wang & Vásquez, 2023; Zawacki-Richter et al., 2023). AI-driven personalization, which creates adaptable, learner-centered environments that bridge the gap between technology and pedagogy while facilitating equal access to high-quality education across contexts, is ultimately a key component of the digital transformation in language education.

Automated Feedback and Assessment in Nigeria

Artificial intelligence's (AI) automated feedback and assessment capabilities, which have revolutionised traditional evaluation and error-correction procedures, are another significant benefit of AI in language instruction. Learners can receive immediate, comprehensive, and context-sensitive feedback on grammar, vocabulary usage, pronunciation, spelling, coherence, and overall communicative quality from AI-powered tools like Grammarly, E-rater, Criterion, and speech-recognition programs like Google Speech-to-Text and Microsoft Azure Cognitive Services. By establishing an instantaneous feedback loop that improves accuracy, engagement, and learner autonomy, this automation of feedback mechanisms tackles one of the ongoing issues in language education: assessment delays and a lack of teacher feedback (Li & Chen, 2022; Li et al., 2022). AI-based systems analyse linguistic data in real time, finding specific faults and proposing contextually relevant improvements, in contrast to traditional techniques that mostly rely on teacher input and delayed corrections. For instance, writing aids like Grammarly and automated essay scoring systems support higher-order writing development by assessing discourse organization, lexical sophistication, and stylistic appropriateness in addition to identifying superficial grammatical errors (Wang & Vásquez, 2023; Holmes et al., 2022). Similar phonetic-level feedback is provided by AI-enabled pronunciation software and Automatic Speech Recognition (ASR) tools, which enable learners to visualize their speech waveforms, compare their pronunciation with native models, and correct articulatory deviations through repeated practice (Gong et al., 2022). This iterative procedure maintains the task's communicative authenticity while promoting form-focused learning. Li and Chen (2022) claim that AI-driven feedback systems greatly improve writing fluency, syntactic accuracy, and pronunciation by offering constant, nonjudgmental guidance that motivates students to explore, edit, and self-correct. By encouraging learner autonomy and reducing reliance on teacher availability, these systems empower students to actively manage their learning trajectory and track their own progress (Lin & Warschauer, 2023). Additionally, automated feedback systems provide teachers with a useful way to reduce their workload, especially in big or open and distance learning (ODL) environments where scale typically limits personalised evaluation. Teachers



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can focus more on higher-order pedagogical activities, such developing critical thinking, communicative competence, and intercultural awareness, by assigning routine evaluative tasks to AI (Holmes et al., 2022; Zawacki-Richter et al., 2023). AI-supported assessment tools not only enhance learner performance results but also encourage formative assessment practices that are consistent with the concepts of continuous learning and reflection, according to additional empirical study (Li et al., 2022; Sun & Zhang, 2024). These technologies create a feedback-rich environment that improves motivation, maintains engagement, and closes the conventional gap between teaching, learning, and evaluation when they are skillfully incorporated into instructional design. Therefore, automated feedback is a crucial aspect of AI's revolutionary potential in language teaching, improving learner empowerment and instructional effectiveness in the digital era.

Intelligent Tutoring Systems

Numerous tasks that are typically carried out by human teachers are replicated by Intelligent Tutoring Systems (ITS). These systems provide personalized explanations, error-correction techniques, and grammar scaffolding by utilizing conversational AI, natural language processing, and predictive analytics. In addition to identifying language problems, ITS models proper usage, encourages reflection from learners, and instantly adjusts to their responses. According to research, integrating ITS into blended learning frameworks with instructor guidance significantly improves student performance and language development (Li & Chen, 2022; Zawacki-Richter et al., 2023). Thus, the combination of teacher experience and AI-mediated tutoring offers a potent model for enhancing the efficacy of training.

Multilingual and Cross-Cultural Access to Learning Resources

Artificial Intelligence (AI) has made multilingual education much more advanced by facilitating smooth cross-linguistic communication and cultural exchange in international learning environments. Learners can now interact effectively with speakers of various linguistic origins and access authentic resources in numerous languages thanks to the development of advanced machine translation technologies, AI-driven chatbots, and translanguing communication platforms. These tools use sophisticated neural machine translation (NMT) algorithms that can analyze idiomatic expressions, language context, and semantic subtleties to produce translations that resemble human fluency and cultural appropriateness (Eubanks, 2021; García & Otheguy, 2022). These technology affordances allow learners to collaborate, communicate, and co-create knowledge in real time across linguistic barriers. According to Eubanks (2021), these developments enable students to actively engage in multilingual digital environments and dismantle conventional barriers to intercultural communication. While conversational agents like ChatGPT, Replika, and Lingvanex bots offer multilingual conversational exercise that strengthens communicative skill, platforms like Google Translate, DeepL, and Microsoft Translator enable instantaneous translation of texts, audio, and video. By placing language learning within actual cross-cultural interactions, these applications not only increase learners' exposure to realistic linguistic input but also facilitate contextualized meaning-making (Wang & Vásquez, 2023; Lin & Warschauer, 2023). AI technologies support the development of intercultural communicative competence (ICC), which goes beyond language competency and is the capacity to communicate successfully and responsibly with people from different linguistic and cultural backgrounds (Byram, 2021). Learners develop cross-cultural awareness, empathy, and openness through ongoing exposure to a variety of language inputs and cultural references—qualities necessary for success in an increasingly globalized and multilingual knowledge society (Holmes et al., 2022; García & Otheguy, 2022). Additionally, translanguaging instruction is supported by AI-enhanced environments, which encourage students to seamlessly draw from their entire linguistic repertoires rather than seeing languages as distinct entities. This method respects the language identities of various learners and acknowledges the dynamic, hybrid nature of bilingual and multilingual communication (Li & Chen, 2022). As a result, the incorporation of AI into multilingual education signals a pedagogical shift that integrates language acquisition with international engagement, global citizenship, and inclusive communication, rather than just a technological advancement. In the 21st-century educational environment, AI fosters mutual understanding, diversity appreciation, and global connectedness by bridging linguistic and cultural divides. It also improves communicative competence and fosters the humanistic aspects of language learning (Eubanks, 2021; Wang & Vásquez, 2023).

Accessibility and Inclusion in Nigeria

AI technologies are essential in advancing inclusivity and equity in language acquisition. By removing obstacles to learning and communication, assistive technologies including speech-to-text converters, automated captioning, predictive text input systems, and audio description software empower students with impairments. According to UNESCO (2023), these developments increase the number of people with visual, auditory, and cognitive disabilities who have access to high-quality language instruction. AI helps create inclusive and socially equitable language-learning environments by providing multimodal learning affordances that accommodate a variety of learner demands.

Ethical Considerations in AI-Enabled Language Education in Nigeria

AI's pedagogical potential is becoming more widely acknowledged, but integrating it into language instruction also brings up important ethical concerns that need to be carefully considered. In AI-mediated learning environments, ethical decision-making takes into account learner privacy, equity, professional agency, technological access, and academic integrity. To guarantee that innovation supports equal learning outcomes and is consistent with human-centered educational objectives, it is imperative to address these issues.



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Data Privacy and Educational Surveillance in Nigeria

Significant amounts of sensitive learner data, such as linguistic blunders, biometric speech patterns, behavioral logs, and learning preferences, are gathered, analysed, and stored by AI-driven systems. These kinds of data are frequently utilised to improve algorithms and customise learning paths. However, issues with long-term surveillance, third-party sharing, data ownership, and informed permission come up. According to Selwyn (2022), AI may promote surveillance-oriented pedagogy that jeopardizes student trust, autonomy, and psychological safety in the absence of clear data governance frameworks. Therefore, protecting students' personal information requires strong privacy regulations, moral data usage guidelines, and instruction on digital rights.

Algorithmic Bias and Linguistic Inequality in Nigeria

AI systems that contain bias have the potential to exclude particular learning groups and maintain linguistic hierarchies. Research indicates that when processing a variety of accents, indigenous languages, and non-standard dialects, speech recognition engines and automated scoring systems frequently exhibit reduced accuracy (Eubanks, 2021; Wang & Vasquez, 2023). Equal learning chances may be hampered by this technology bias, which has the potential to reinforce linguistic discrimination and favor dominant language norms. Building equitable and culturally sensitive AI systems requires openness in algorithmic design, inclusive training datasets, and ongoing cultural-linguistic auditing.

Teacher Professional Identity and Pedagogical Agency in Nigeria

Concerns regarding the changing roles of educators are raised by the growing automation of instructional and evaluation processes in Nigeria. Some stakeholders worry that AI will replace teachers or make them less relevant in schools. But as Holmes et al. (2022) point out, teachers are still essential for encouraging critical thinking, emotional engagement, learner advocacy and cultural mediation; skills that AI cannot match. AI should be positioned as a helpful tool that increases teacher efficiency, fosters innovation and frees up professional time for mentoring and higher-order instruction rather than taking the place of educators in Nigeria.

Digital Divide and Access Inequities in Nigeria

In spite of AI's revolutionary potential, there is a significant disparity in who gains from AI-enhanced learning due to unequal access to reliable internet, digital devices and technological infrastructure. Access to emerging technologies is restricted for learners from low-income families, rural locations and developing regions due to systemic hurdles. AI deployment runs the risk of exacerbating already-existing educational disparities in the absence of focused digital-equity legislation. Governments and organizations must fund infrastructure, reasonably priced connectivity and initiatives to build digital skills in order to guarantee inclusive implementation.

Academic Integrity and Authentic Learning in Nigeria

The emergence of AI-generated content, translation tools, and language automation presents new issues about learner integrity and the creation of authentic knowledge. Hall (2023) warns that students may abuse AI tools for plagiarism, avoiding important skill development and cutting down on language practice. Nigerian schools must therefore develop ethical AI literacy, incorporate responsible-use guidelines and create tests that prioritize oral communication, creativity and process-based evaluation over submissions that are solely product-focused.

Conclusion

With its unparalleled potential for individualised training, real-time feedback, multilingual participation and inclusive instructional support, artificial intelligence has become a potent driver for innovation in language education. Its transformational potential in contemporary pedagogical settings is highlighted by its ability to automate assessment procedures, enhance interactive language practice and tailor instruction to specific learner profiles. Language learning is becoming more accessible, effective and learner-centered as global educational systems incorporate AI-driven platforms more and more. However, using AI in language instruction needs to be done with careful ethical consideration. Data privacy, algorithmic justice, digital equity, teacher identification and academic integrity are all complicated problems that should not be disregarded. Without the right protections, AI could exacerbate systemic prejudices, increase already-existing educational disparities and threaten the humanistic principles that are essential to education. In order to guarantee that AI applications promote educational equity and respect learner rights, ethical frameworks, legal regulations and institutional accountability systems are essential. The key to the future of AI-enhanced language instruction is to embrace a human-centered and balanced viewpoint that sees technology as an ally rather than a replacement for teachers. AI may significantly improve language learning experiences and help create more empowered, culturally sensitive and globally connected learners when it is based on thorough research, ethical standards and strong professional development. AI has the potential to greatly improve language proficiency and encourage global educational reform through careful and prudent application.

Recommendations



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The following are suggested to maximise AI's transformational potential while preserving moral, educational and equity-based values in Nigeria:

1. Students should get instruction on ethical AI use, critical thinking and academic integrity in order to prevent academic dishonesty and promote digital citizenship.
2. For marginalised and underprivileged learners to benefit from AI, implementing inclusive policies and making targeted infrastructure improvements is paramount.
3. Teachers should have periodic trainings on digital pedagogy, ethical technologies and AI literacy to improve the quality of learning, encourage creativity and guarantee ethical technology usage.
4. Educational institutions and regulatory agencies should put in place clear policies pertaining to data governance, permission, privacy, transparency and responsible AI use.
5. Rather than being used to replace teachers, AI should be viewed and implemented as a supplementary teaching tool.
6. Government and stakeholders in the Nigerian educational system should expand and provide equal access to tech digital devices, internet connectivity and accessible AI platforms.
7. To identify and reduce algorithmic bias, developers must train AI language models on a variety of linguistic datasets that represent dialects, accents and less-dominant languages.

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