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Meta-analysis of the Role of Digital Tools and Artificial Intelligence in Enhancing English Language Learning in Nigerian Tertiary Institutions

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Abstract

The integration of digital tools and artificial intelligence (AI) into English language learning is transforming higher education globally. However, in Nigerian tertiary institutions, the adoption of these technologies remains inconsistent despite their potential to enhance students' language proficiency. This paper explores the role of AI-driven tools, mobile applications, and online platforms in improving English language learning among Nigerian students. It examines how these technologies facilitate personalized learning, provide instant feedback, and enhance engagement through interactive content. The study also highlights key challenges such as digital literacy gaps, infrastructural limitations, and reluctance to integrate technology in traditional pedagogical settings. Using a meta-analysis approach, this article reviews extant literature on the effectiveness of AI-enhanced learning tools and proposes strategies for their seamless integration into English language instruction in Nigerian universities, colleges of education and polytechnics. The results of this exploration aim to contribute to policy discussions on digital education and provide practical recommendations for improving English proficiency in Nigerian tertiary institutions through AI-driven learning solutions.

Keywords: *Artificial Intelligence; Digital Tools; Enhancing English Language Learning; Nigerian Tertiary Institutions*

Introduction

The rapid advancement of technology has profoundly reshaped the global educational landscape, with digital tools and artificial intelligence emerging as key drivers of innovation, particularly in language learning. These technologies have introduced new possibilities for personalized, interactive, and self-paced learning experiences that respond to the diverse needs of learners. In the Nigerian context, the significance of English language cannot be overstated, as it functions both as the official language of communication and the principal medium of instruction across all levels of formal education, especially in tertiary institutions. However, despite this central role, a considerable number of students enter universities, polytechnics, and colleges of education with inadequate command of the English language.

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This persistent deficiency can be attributed, in large part, to the continued reliance on traditional instructional methods that dominate many Nigerian classrooms (Okpara, 2014, p. 140). These approaches often emphasize rote memorization, grammar drills, and textbook-centred learning, with limited opportunities for students to engage in communicative or task-based language use. Consequently, students are frequently ill-prepared to meet the linguistic demands of academic discourse and professional communication. Furthermore, the lack of integration of modern educational technologies into the language curriculum contributes to this gap, as learners are not exposed to innovative tools that could enhance their acquisition of core language skills. Addressing these challenges requires a paradigm shift in both pedagogy and policy, one that embraces the transformative potential of digital tools and AI to foster more effective and engaging English language learning experiences in Nigerian tertiary institutions.

To address the persistent challenges associated with English language acquisition in these institutions, a new generation of AI-powered learning tools has emerged as promising interventions. Applications such as Grammarly, ChatGPT, and Duolingo represent innovative approaches to language instruction, offering features that significantly enhance the learning process. These tools are equipped with advanced natural language processing capabilities that enable them to provide real-time, context-sensitive feedback on grammar, syntax, vocabulary usage, and so on. This immediate corrective feedback is especially valuable in helping learners identify and rectify errors independently, thereby fostering greater learner autonomy and self-awareness.

Moreover, these technologies support personalized learning experiences by adapting to the individual learner's pace, proficiency level, and specific areas of weakness. Through intelligent algorithms and user-friendly interfaces, they promote sustained engagement by incorporating interactive elements such as exercises in the form of games, conversational simulations, and adaptive tasks. As a result, learners are not only able to practice language skills more regularly and independently but also benefit from a learning environment that is both responsive and immersive. Collectively, these features make AI-powered tools effective complements to traditional classroom instruction, with the potential to transform language learning into a more efficient, dynamic, and learner-centred process.

This article seeks to examine the role of digital tools and AI in enhancing English language learning in Nigerian tertiary institutions. It explores the benefits, challenges, and practical strategies for integrating these technologies into the curriculum. By evaluating their impact on students' learning experiences, this study aims to contribute to ongoing discussions on educational reform and technology adoption in Nigerian higher education sector.

Overview of English Language Education in Nigerian Tertiary Institutions

English occupies a central position in Nigeria's educational system, serving as the official language and the primary medium of instruction across all levels of education. In tertiary institutions, English is not only a compulsory subject in General Studies (GS) courses but also a fundamental requirement for academic communication and research (Ogbu, 2020, p. 267). Given Nigeria's multilingual landscape, English functions as a unifying language, facilitating interaction among students from diverse linguistic backgrounds. As a result, proficiency in English is essential for academic success, professional advancement, and participation in global discourse.

Despite its significance, the standard of English language proficiency among students in Nigerian universities, colleges of education and polytechnics remains a persistent concern. Many students enter tertiary institutions with high grades in English from the Senior School Certificate Examination (SSCE), yet they struggle with fundamental aspects of the language, including academic writing, critical reading, and effective communication (Agwu, P. et al., 2024). This discrepancy raises questions about the effectiveness of pre-tertiary English instruction and assessment methods, which often emphasize rote memorization over practical language use. Additionally, limited exposure to English in students' everyday interactions, combined with the pervasive influence of Nigerian Pidgin English and indigenous languages, further compounds the challenge.

In response to these deficiencies, English language instruction at the tertiary level typically aims to reinforce students' linguistic competence through General Purpose English (GPE) and English for Specific Purposes (ESP) courses. These courses focus on grammar, comprehension, composition, and oral communication skills, with particular emphasis on academic writing and workplace communication. However, the effectiveness of these programmes is frequently hindered by factors such as persistently ineffective curricula, large class sizes, and a lack of technologically enhanced learning resources. In this regard, Sotiloye et al. (2016) emphasize that large class sizes often hinder effective language instruction, leading to suboptimal learning outcomes. In overcrowded classrooms, students may struggle to maintain focus due to various distractions, particularly when the physical space is insufficient to accommodate them comfortably. Furthermore, managing such a learning environment presents significant challenges for instructors, ultimately limiting meaningful teacher-student interactions and impeding effective pedagogical engagement (p. 9). Moreover, the traditional lecture-based approach to teaching English in Nigerian higher institutions often fails to engage students in interactive, real-world language use, resulting in a continued gap between theoretical knowledge and practical proficiency.

Moreover, Ugwuanyi and Omeje (2013) present a comprehensive argument on the systemic challenges hindering effective English language education in Nigerian tertiary institutions, contextualizing these issues within the demands of globalization. Their study highlights challenges including overcrowded classrooms, inadequate teaching facilities, and inadequate utilization of updated textbooks, which hinder effective language acquisition. Additionally, the prevalence of underqualified instructors, resistance to professional development, and mother-tongue interference further exacerbate students' poor proficiency. The authors emphasize how globalization intensifies the demand for English competency while Nigeria's educational infrastructure struggles to meet these needs, particularly due to limited ICT integration and an insufficient one-year curriculum for foundational English courses (pp. 38-39). To address these issues, they recommend pedagogical reforms, such as enhanced teacher training, expanded use of digital resources, and curriculum realignment to foster communicative competence in a globalized context (pp. 40-41).

The Growing Role of Digital Tools and AI in Global Education

The rapid advancement of digital tools and artificial intelligence is reshaping education worldwide, offering unprecedented opportunities to enhance teaching, learning, and accessibility. As globalization and technological innovation continue to evolve, educational systems are increasingly integrating AI-driven platforms, adaptive learning technologies, and digital resources to address diverse learning needs, bridge educational disparities, and prepare

students for a digitally driven future. Sandhu et al. (2024) provides a comprehensive exploration of how generative AI can revolutionize education. They argue that Generative AI enables the creation of tailored educational content that adapts to individual student needs, addressing diverse learning styles and proficiency levels: "Generative AI enables the creation of personalized learning materials tailored to individual student needs. By analysing student preferences, learning styles, and performance data, the technology generates customized content that optimally aligns with each learner's strengths and weaknesses" (p. 10). They further assert that "intelligent chatbots powered by Generative AI facilitate interactive and dynamic communication between students and educational platforms. These chatbots can provide real-time assistance, answer queries, and offer personalized guidance, fostering a more responsive and supportive learning environment" (p. 11).

This indicates that the integration of artificial intelligence in education has become a transformative force, offering solutions to critical challenges such as accessibility, personalized learning, and administrative efficiency. Supporting this view, Ahmad et al. (2021) emphasize that AI applications—such as intelligent tutoring systems (ITS), social robots (SR), and smart learning (SL)—address contemporary educational barriers, particularly those intensified during the COVID-19 pandemic (p. 1). Their study highlights AI's potential to enhance learning through automation, adaptability, and round-the-clock accessibility, thereby making education more inclusive, flexible, and effective.

Haleem et al. (2022) maintain that the integration of digital tools, such as Massive Open Online Courses (MOOCs), virtual classrooms, and AI-powered platforms, has significantly reshaped the educational landscape. These technologies provide learners with dynamic, flexible, and interactive learning environments that extend beyond the limitations of traditional classrooms (p. 275). A key advantage of these tools is their capacity to support personalized learning by adapting to individual students' needs, learning speeds, and preferences. In doing so, they promote greater learner engagement and improved academic outcomes, marking a significant step toward more inclusive and effective education systems.

Oluyemisi (2023) underscores the profound impact of artificial intelligence and digital technologies on curriculum development and implementation in Nigerian tertiary institutions, reflecting broader global trends in educational innovation. A key aspect of this transformation is the capacity of AI tools such as machine learning and natural language processing to enable highly individualized learning experiences. For instance, Intelligent Tutoring Systems (ITS) draw on data about learners' existing knowledge and skills to deliver targeted instruction tailored to their specific needs (p. 195). Similarly, adaptive learning platforms use real-time performance data to adjust content dynamically, enhancing student engagement and supporting improved academic outcomes (p. 196).

Ogunode et al. (2023) emphasize the transformative role of artificial intelligence in reshaping the management and delivery of tertiary education in Nigeria. Their study highlights AI's potential to streamline administrative functions while also enhancing teaching, learning, and institutional security (p. 21). A key benefit of AI is its capacity to support personalized education by analysing student data to tailor instructional content and recommend courses aligned with individual interests. Additionally, AI-driven virtual assistants and chatbots offer continuous academic support, enabling students to access help and resolve queries at any time (p. 22). Adaptive learning algorithms further contribute by identifying specific learning

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challenges, allowing educators to implement targeted interventions that enhance student performance (p. 22).

Digital Tools and AI in English Language Learning

The integration of digital tools and Artificial Intelligence into English language learning has redefined pedagogical approaches in tertiary education, offering innovative solutions to traditional challenges. These technologies have enhanced learner autonomy, engagement, and performance by providing personalized, interactive, and accessible platforms for language acquisition. Tools such as Grammarly, QuillBot, and AI-powered proofreaders support writing and grammar development by offering real-time corrections and stylistic suggestions. Similarly, speaking and pronunciation tools like ELSA Speak and Google Assistant enable students to practice oral communication skills with instant feedback. Interactive platforms including Duolingo, BBC Learning English, and Coursera foster immersive language learning experiences by incorporating interactive and organized learning modules. Moreover, AI chatbots and virtual tutors such as ChatGPT, LingQ, and AI-based discussion forums create conversational environments that simulate authentic language use and promote continuous learning.

This section examines the educational significance of digital tools and their transformative impact on English language learning in Nigerian tertiary institutions. It focuses on how these technologies enhance language acquisition through personalized instruction, interactive engagement, and real-time feedback.

A systematic review by Raheem et al. (2023) provides compelling evidence that AI-powered tools such as Grammarly, QuillBot, and ChatGPT significantly enhance English language learning and academic writing. These tools improve grammar, vocabulary, fluency, and writing efficiency by offering personalized feedback and support to both native and non-native English speakers. Grammarly, for example, enhances grammatical accuracy and vocabulary (pp. 609–610), while QuillBot aids in paraphrasing, fluency, and upholding academic integrity through its plagiarism detection feature (p. 605). ChatGPT facilitates idea generation and conversational practice, thus boosting productivity and engagement (pp. 613–614). These tools also cater to varying proficiency levels with features like tone adjustment and multilingual support (pp. 605, 610). However, the review raises important ethical and pedagogical concerns, cautioning that overreliance on AI may inhibit critical thinking and originality, and highlighting the risks of misinformation and data privacy breaches. Nonetheless, the findings affirm the overall positive influence of AI tools on language learning, especially when used alongside effective instructional guidance (pp. 614–615).

Anis and Bouigha (2024), in their dissertation titled *Teachers' and Students' Perception about the Effects of Using ChatGPT, Grammarly, and Quillbot on Students' Writing Skills*, emphasize the substantial benefits of AI-powered tools in enhancing English language learning, particularly in academic writing. These tools support students by improving grammar, coherence, and idea development, while offering real-time, personalized feedback that fosters writing refinement. Students reported greater motivation and confidence due to the supportive and non-judgmental nature of AI assistance. Quillbot was especially useful for paraphrasing and summarizing, aiding academic integrity, while Grammarly helped correct grammatical errors and expand vocabulary. The study reveals that 64% of students regularly used these tools for writing tasks, and teachers noted clear improvements in students' writing

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abilities. However, they stressed that AI tools should serve as supplements to, rather than substitutes for, traditional pedagogical approaches (pp. 5, 15, 71–77, 83–86). The research recommends a balanced approach, integrating AI tools to enhance learning while ensuring students develop foundational writing abilities. By combining AI assistance with traditional teaching methods, educators can leverage technology to improve writing proficiency while maintaining academic rigor (pp. 77, 86).

Given the increasing globalization of education and the growing reliance on digital platforms for knowledge acquisition, this paper contends that there is an urgent need to critically reassess and modernize English language instruction in Nigerian tertiary institutions. As the global academic and professional landscapes evolve, proficiency in English, particularly in its academic and communicative forms, has become an essential skill for students' success. However, traditional pedagogical approaches in many Nigerian institutions have not kept pace with these global shifts, often relying on outdated, teacher-centred methods that limit student engagement and practical language use.

In response to these limitations, the integration of digital tools and artificial intelligence into English language teaching methodologies offers a promising and innovative pathway forward. These technologies enable personalized learning experiences, facilitate real-time feedback, and promote active, learner-centred instruction. AI-powered applications and online platforms can address diverse learner needs, bridge proficiency gaps, and support continuous skill development both inside and outside the classroom. Therefore, the thoughtful incorporation of digital technologies into English language curricula is not merely an enhancement but a necessary transformation to align Nigeria's higher education system with contemporary global standards.

Al-Shaboul et al. (2024) provide valuable insights into the role of AI-powered writing tools in enhancing language learning, which can directly inform efforts to modernize English language instruction in Nigerian tertiary institutions. The study highlights the effectiveness of AI-driven tools like Grammarly, QuillBot, and ChatGPT in improving grammar, coherence, and idea generation in foreign language writing. This aligns with the need to integrate such tools into Nigerian institutions to address challenges in English proficiency. To quote Al-Shaboul et al: "AI writing-tools have shown the right influence on undergraduates' capacity to develop an idea even further. Many of these tools are likely to provide an alternative, more effective way to express a certain message in words or phrases that are to the point." (p. 164). This means that AI writing tools have the potential to positively influence students' ability to develop and express their ideas more clearly and effectively. By offering real-time suggestions and alternative phrasing, these tools can substantially help students refine their thoughts and communicate their messages with greater clarity and precision. The study suggests that the adoption of technology-driven solutions can empower educators to deliver more personalized and adaptive learning experiences, foster greater student engagement, and bridge the gap between secondary school English instruction and the linguistic demands of higher education. This is because "the lecturers are considered the most suitable stakeholders in the study as they are in the position to access written essays of their students. They also understand the importance of integration of certain AI-powered tools in enhancing the students' writing" (p. 157).

Regardless of the promising benefits highlighted above, the successful implementation of AI in Nigerian tertiary institutions is not without challenges. Chiedu and Ohwonohwo's (2021)

comprehensive evaluation of e-learning challenges in Nigerian tertiary institutions offers a critical foundation for understanding the potential barriers to the integration of Artificial Intelligence within the same context. Their analysis identifies a range of systemic impediments that, while discussed in relation to e-learning, are equally relevant to AI adoption. For example, key among these are infrastructural deficiencies, such as limited access to technological devices and unreliable internet connectivity, which severely restrict the capacity of institutions to deploy AI-driven educational tools (p. 4). Moreover, a significant skills gap exists among both educators and students, many of whom lack the technical competence required to utilize AI technologies effectively (p. 5). These factors signal that without deliberate and sustained intervention, the integration of AI into Nigeria's higher education system will encounter significant operational difficulty.

Further reinforcing these concerns, Kayode and Odumabo (2024) identify several critical challenges hindering the adoption of Artificial Intelligence technologies in Nigerian universities, based on empirical data from six institutions in Southwestern Nigeria: inadequate IT infrastructure (cited by 95% of respondents), including unreliable power and internet connectivity; lack of institutional strategy (87.4%) and organizational maturity (85.8%), reflecting resistance to change and policy gaps; poor data governance (84.4%) concerning data quality and security; and unaddressed financial and technical skill constraints (pp. 7-8). These systemic barriers mirror broader ICT adoption challenges in Nigerian education underscoring the need for infrastructure investment, capacity building, and policy frameworks to enable effective AI integration (p. 9).

Despite the challenges outlined above, the potential of Artificial Intelligence to transform English language learning in Nigerian tertiary institutions remains significant. The next section of this study seeks to propose practical and context-sensitive strategies for the effective adoption of AI technologies in English language instruction.

Strategies for Effective AI Integration in English Language Instruction in Nigeria

The integration of Artificial Intelligence into English language learning in Nigeria requires a robust framework for training and capacity building among lecturers. This involves equipping educators with both traditional pedagogical skills and advanced digital competencies, including the use of AI tools such as machine learning and natural language processing. Tailored professional development programs, workshops, and continuous learning modules are essential to bridge the gap between conventional teaching methods and the evolving technological landscape, thereby enabling lecturers to utilize AI for personalized instruction, administrative efficiency, and data-driven student performance analysis.

Institutional commitment and collaborative partnerships are also crucial to ensure the effective integration of AI in educational settings. Academic institutions must invest in digital infrastructure and ongoing support systems, including mentorship and peer collaboration, while working with technology developers and governmental agencies to create localized AI applications. These collaborative efforts not only enhance the quality of English language instruction but also empower lecturers to engage in continuous research and innovation, ensuring that Nigerian higher education remains at the forefront of digital transformation.

Promoting blended learning approaches in Nigerian tertiary institutions involves strategically integrating traditional classroom instruction with online educational technologies to create a

more flexible and engaging learning environment. This pedagogical model capitalizes on the strengths of both face-to-face and digital learning modalities, providing students with a more personalized and adaptive learning experience. By utilizing digital tools and platforms, educators can develop curricula that incorporate diverse instructional approaches, accommodate different learning styles, and promote collaborative learning environments. In this context, blended learning not only facilitates the seamless integration of advanced technologies into academic programs but also enhances student engagement and academic performance through interactive and data-driven teaching methods.

The successful adoption of blended learning in Nigerian tertiary institutions requires a concerted effort from academic leaders, educators, and policymakers. Institutional commitment is paramount, as it involves investing in the necessary digital infrastructure, providing comprehensive training for lecturers, and ensuring the availability of support systems for both lecturers and students. Moreover, a collaborative approach that includes partnerships with technology providers and continuous professional development initiatives is essential to address challenges such as digital literacy gaps. By cultivating a culture of innovation and encouraging adaptive teaching practices, Nigerian tertiary institutions can position themselves at the forefront of modern education, ultimately preparing students for the demands of the digital age.

Conclusion

The integration of digital tools and artificial intelligence in Nigerian tertiary institutions offers significant potential to enhance English language learning by fostering personalized, adaptive, and interactive learning experiences. As demonstrated, AI-powered applications such as Grammarly, ChatGPT, and QuillBot have the capacity to support improved writing, grammar, and overall language proficiency by providing real-time feedback and facilitating critical language use. However, to realize these benefits, it is essential to address prevailing challenges such as inadequate digital infrastructure, limited technical expertise among lecturers, and the reluctance to change from traditional teaching methods to digital technology-enhanced instruction.

Moreover, strategic investments in capacity building, institutional commitment, and the adoption of blended learning approaches are necessary to ensure the effective integration of these technologies into the curriculum. Collaborative partnerships between academic institutions, technology developers, and policymakers can create a supportive platform that can enhance teaching and learning practices in Nigerian higher institutions of learning. In the long run, aligning technological innovation with targeted educational reforms, Nigerian tertiary institutions can better equip students with the linguistic and digital competencies required to thrive in a globalized and increasingly digitalized academic environment.

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